NOV 8 1917

THE IRON TRADE REVIEW

Single Copies 15 Cents — CLEVELAND, NOVEMBER 8, 1917 — Four Dollars a Year

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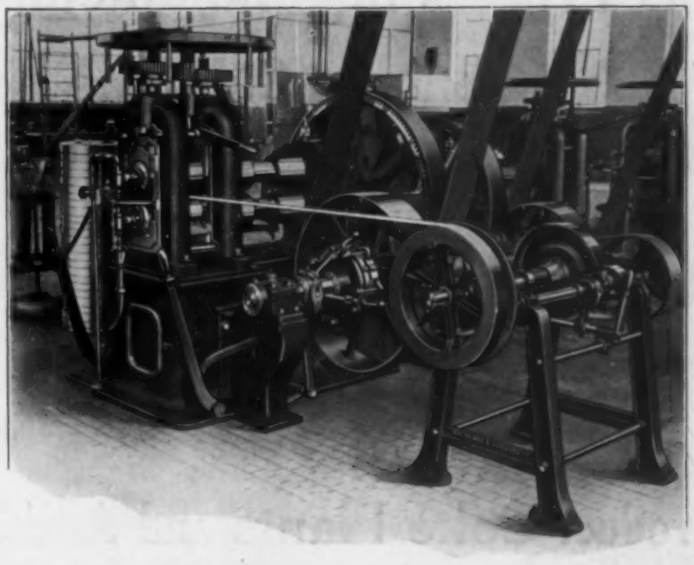
FOR REDUCING METALS TO THIN GAUGES, GANG-SLITTERS, ETC.



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THE IRON TRADE REVIEW

Vol. LXI Cleveland, November 8, 1917 No. 19

Market Returning to Normal Basis

Further Announcement of Agreed Prices Clears Up Overhanging Uncertainty and New Buying is Stimulated in Various Lines—Remaining Adjustments to be Left by Government to Industry Itself

MARKET equilibrium in iron and steel, which has been upset by the uncertainties of government regulation, largely has been restored. Further official announcements which the week has brought forth have gone far to fill in the gaps in the agreed price schedule. It is more evident that the government proposes to leave to the industry itself the enforcement of the fixed maximums on mill and furnace products, as well as the settlement of such details as remain to complete the market's realignment. Federal initiative is to be exercised rarely, if at all, in further price decisions. Responsibility for the adjustment of unregulated lines, especially in finished material, is placed with the manufacturer and is to be made in accordance with the established market standards. These functions are expected to converge in the general committee of the American Iron and Steel institute. The process of adjustment under producers' auspices, already is well under way.

The hazardous proposal of a general abrogation of contracts by the federal trade commission continues to meet with vigorous condemnation from both buyers and sellers. The most substantial interests of the industry regard the suggestion as contrary to fundamental business precepts and are opposing it strongly.

Uniformity in Price Restored

The agreed prices on finished steel represent some sharp cuts from the previous open market levels. This is particularly true in sheets where they are lower than the makers had expected. The government figures will have the effect of re-establishing uniformity in various products in which a variety of schedules were being quoted. Tubes and wire especially are in this class. Independent wiremakers have reduced their prices from $10 to $14 to conform to the fixed level, which is the same as that to which the leading interest recently advanced. In tubes, the government schedule is $8 above the last National Tube Co. card, which largely was nominal, and $4 below those of the independents. These discrepancies now have been eliminated by action of the mills. The fixed scrap prices proved a surprise since they are higher than those at which the grades stipulated recently have been selling. Scrap represents the only material in which the government has revised prices upward. Heavier buying of finished steel is promised by the clarifying effect of the new prices. New inquiry has begun to appear heavily in some lines, notably in sheets. Sales of finished steel to private consumers at agreed prices are increasing.

Pig Iron is Active

More active selling of pig iron is following the final fixing of price differentials covering all grades. As many provisional contracts now are being converted to regular form, the good faith of the producers in adhering to the government schedule is set forth more concisely. It now is confirmed that October sales were much heavier than generally realized. The transactions upon which the October averages of $33 and $36.30, valley, for basic and bessemer, respecticely, were computed, were approximately 100,000 tons. In eastern Pennsylvania the week's sales totaled 40,000 tons. A 10,000-ton sale of basic to a Youngstown consumer is announced. The Italian government has placed 30,000 tons of bessemer. Inquiry is sharp and continues to broaden. A St. Louis steelmaker wants 12,000 tons of basic and the Pennsylvania railroad 13,000 tons of foundry. Some producers are canvassing their trade to definitely determine the requirements for war purposes to which preference must be given, so that they can gage the tonnage left for other consumption up to July 1.

Coke Holds Iron Output

Irregularities of the present furnace operations, due mainly to fluctuating coke supply, are shown by the pig iron statistics for October. With 354 furnaces active, the average daily output was only 106,304 tons, compared with 328 active furnaces and 113,167 tons in October, 1916, and with 276 furnaces active and 100,656 tons daily in October, 1915. Production last month was 3,295,409 tons, the fourth best showing for the year to date. Present maintenance of the recent level of heavy output is due to the many additions to the list of going stacks.

The Iron Trade Review

EDITORIAL

Mr. Cokemaker, Play the Game

CHEERFUL acceptance of the government fixed prices on their products is the fine record of liberal appreciation of duty which is being inscribed to the honor and patriotism of the iron and steel manufacturers as a whole. It is true there are some cases where the mills are not conforming in their sales to the agreed price schedules. These instances, however, are exceptional. Invariably they concern those mills which not being producers of their own steel are operating with high cost raw materials previously engaged and are seeking to clear their obligations without loss. These producers relatively are small and their irregularity is not of serious portent.

A large tonnage of steel is being marketed by the general industry at the agreed prices. Much of this is to the government itself but an increasing tonnage is being made available to regular customers. The same is true of pig iron. The tonnage of iron sales at reduced prices in the open market has been large. October bookings amount to several hundred thousand tons and were considerably heavier than superficial indications show. In numerous cases these sales are being made to cover deliveries up to July 1, 1918.

Can the same be said regarding the coke makers? Unfortunately, it cannot. Virtually no coke has been sold at the agreed prices. It is practically impossible for consumers to obtain quotations as the oven operators report they have no unsold fuel to offer. Why they have not is not readily understandable in view of the fact that before the government prices were fixed liberal tonnages of spot coke were being sold at the very attractive figures of from $12 to $16 per ton which prevailed in an uncontrolled market. Car and labor shortages are no worse today; in fact, under government regulation they are more stable. Furthermore, some of the coke producers have been pursuing tactics calculated to evade government prices and in fact certain interests are reported to have been quoting considerably over the agreed figures.

There is a greater responsibility on the coke makers to play the game fair than upon any single branch of the iron and steel industry. Their product is indispensable to the production of iron and steel. It is patent that unless the furnaces in the not distant future are able to get coke at $6 neither they nor the steelmakers can sell their product without assuming an unfair paring of their rightful portion of allotted profits. The cokemakers deliberately are courting vigorous action by the government by their narrow and obstructive tactics. Some of their number are going so far as to raise the legality of the fixed price on the ground it was made by the war industries board and not by the President, to whom specific authority had been delegated by the Lever bill. Therefore, they argue they are not bound by the $6 price. This position is untenable since the President approved the prices announced by the war industries board. Furthermore, representatives of the coke producers were present at the general Washington meeting of manufacturers and pledged their industry to the maintenance of the reduced price program. The folly of this position is all the more apparent since of all materials of the iron and steel industry, coke is the only one which formal and sweeping legal authority has been given to the President under the Lever bill to regulate and to distribute. Furthermore, the pig iron and steel makers by way of contrast are hiding behind no technicality. They are manifesting their co-operation with the government by selling at the agreed prices, the legal warrant for which is open at least to honest question.

By their selfish actions, the cokemakers are lending support to those radicals who are advocating a general abrogation of contracts. They are furnishing the only semblance of justification to a proposal which not only manifestly is unfair to the iron and steel industry but represents a dangerous doctrine for all business.

Uniform Specifications Needed

INVESTIGATION by the railroads war board has shown that shipments of iron and steel scrap average only about 50 per cent of the rated capacity of the cars used. The commission insists that this average can and must be brought up to 110 per cent. Other kinds of freight are being loaded to more than the capacity rating of the cars, both open and box. The problem, however, is a little more complicated in the case of the scrap shipper. Sometimes he is a broker who gets his carloads from a scrap producer and ships it to the consumer in the condition in which he finds it. Sometimes he is a dealer who makes up his shipments in his own yards. But a faithful effort plus a spirit of co-operation in attacking this problem will bring the desired results.

One of the most important phases of the scrap transportation problem is the too frequently exercised privilege of rejection by the consignee. Rejections are often justified; for there are dealers who are not above "doctoring" their shipments after the manner

of hucksters with fruit—the better material on top and the junk below. The more reputable dealers are beginning to deal with this problem and undoubtedly, through the American Board of Scrap Iron Dealers, should be able to stop the practice. Unscrupulous producers, too, must be reached, and will be. But it has been repeatedly charged in recent months, and not denied, that consumers frequently reject scrap because of other reasons than imperfect consignments; chief among these reasons being reluctance to accept high-priced scrap on a falling market.

One step should be taken as soon as possible. Uniform specifications governing all of the principal divisions of the scrap list ought to be put into effect. There are now almost as many specifications as there are companies using scrap. Only one organization of size as yet has adopted a list of uniform specifications —the American Foundrymen's association. The plan should be extended to cover the entire iron and steel metal trades as well.

A uniform and universal list of scrap specifications would constitute the only stable basis upon which the inspection system proposed by the organized scrap dealers to combat rejections could attain a maximum of result with a minimum of effort.

War Forces Business Readjustment

THAT an unprecedented drive upon industry is enveloping this country as well as an equally great congestion of transportation facilities is becoming plain as events progress. War, of course, is at the root of this unparalleled pressure upon the nation's resources. Congress has just appropriated $21,390,000,000 for war purposes, and this is but the beginning. Part of this huge sum will be loaned to our allies, but all of it will be spent in the United States. A great share will be for materials, more or less finished, the largest items being of iron and steel. To produce and transport the material to be bought by this huge sum will tax every effort of the producer for months.

The total business of the United States Steel Corp. for 1916 was $1,270,000,000, or barely 6 per cent of the amount appropriated by the government for war expenditures for the near future. Injection of such an enormous emergency demand into the markets of this country and from a preferred customer whose needs take precedence over all others, means that the entire business structure of the nation must be recast.

Room must be made for this Goliath among buyers. His appetite can be appeased only by stinting the supply to others and the sooner this fact is given full recognition and plans are laid to meet the emergency, the less shock the business world will be obliged to sustain. When one buyer purposes taking ten to sixteen times the total business of the Steel Corporation the rest of the business world needs to trim its sails and to steer a new course in order to avoid disaster or, at least, disappointment.

The American Camp in France

EVERY student of the war has given some thought to the problem of establishing a large American army in Europe. To many, ships, guns, ammunition and food have loomed up as the all important requisites. To properly equip and provision a million men thousands of miles from their source of supplies is a task vaguely vast and incomprehensible to the average person. Lord Northcliffe, in a recent address in the interests of the second sale of Liberty bonds, stated that transporting and maintaining Pershing's soldiers is equivalent to building and supporting in France a city the size of Cleveland or Detroit. From this statement, one can easily grasp the significance of the huge responsibility now confronted by the United States.

To the manufacturer of iron and steel products, it means that in addition to the materials for ordnance, ships, trucks and planes, American mills must provide the gigantic needs of a great city. Cast iron, wrought iron and steel pipe must be furnished in great quantities for the waterworks system. Steel rails will be required for the inter-camp transportation lines which must be built and thousands of tons of wire must be available for lines of telegraph and telephone and other purposes.

In attempting to establish this great American community in France, the United States is obliged to proceed without the aid of precedent. Never before has a nation maintained such a large force in a distant land, and the risks attending the transporting of much smaller contingents have never approached those of the present instance. To successfully install vast troops in Europe will require the best from every American manufacturer. The makers of guns, shells and aircraft, who have been in the limelight since the beginning of the war, are no more important in the scheme of military organization, than the men who provide the equipment which administers to the comforts of the fighters. There is work for everyone, and when the war is over, there will be glory enough for all.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1026

PIG IRON

(Delivery this year.)

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 34.50
Malleable, Buffalo	33.50
No. 1X, Phila.	35.00 to 35.25
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
*No. 1 foundry, Chicago	
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.00 to 34.25
No. 2X foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.00
No. 2 plain, Philadelphia	33.50 to 33.75
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 plain, Buffalo	33.00
No. 2 southern, Birmingham	33.00
No. 2 southern, Cincinnati	35.90
No. 2 southern, Chicago	37.00
No. 2 southern, Phila. del.	38.30 to 38.80
No. 2 southern, Cleveland	37.00
No. 2 southern, N. Y.	38.75 to 39.25
No. 2 southern, Boston	39.00
No. 2 south. interior, N. E.	39.00 to 39.75
No. 2 southern, St. Louis	35.40
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.25
Virginia, No. 2X, Jersey City	36.50
Virginia, No. 2X, Boston	36.75
Gray forge, eastern Pa.	32.00
Gray forge, Pittsburgh	32.95
Gray forge, furnace	32.00
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chgo.	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon furnace	50.00
Low phos., Pittsburgh	55.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
*Connellsville foundry, contr.	
*Connellsville foundry	
*Wise county furnace, contr.	
*Wise county foundry, contr.	
*Pocahontas furnace, contr.	
*New River foundry, contr.	
*New River furnace, contr.	

FERRO ALLOYS

Ferromanganese, 1917	$250.00
Ferromanganese, 1st quar.	250.00
Spiegel, 20 per cent fur.	65.00 to 67.50
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	155.00 to 165.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	130.00 to 150.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60
Bessemer ferrosilicon, 13 per cent.	64.90

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
*Forging, Pittsburgh	
*Forging, Philadelphia	
*Forging, Chicago	

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Open hearth, Cleveland	52.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

*Not determined.

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Cotton ties, Pitts., Nov.	$2.15
Bar iron, Chicago	4.50c to 5.00c
Bar iron, Philadelphia	4.685c to 5.185c
Bar iron, Cleveland	4.25c to 4.50c
Bar iron, New York	4.695c to 5.195c
Bar iron, Pittsburgh	4.50c to 4.75c
Hard steel bars, Chicago.	4.25c to 4.50c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill	38.00 to 40.00
Relayers, light, Chicago	60.00
Relaying rails, light, St. L.	60.00 to 62.00
Spikes, railroad, Pittsburgh.	5.00c to 5.50c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh.	4.35
Barb wire, painted, Pittsburgh.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts.	9.00c
Sheet piling, base, Pittsburgh	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 7.00c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chic.	5.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	
No. 28, bessemer, Pitts.	

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chic.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base.....$7.75

IRON AND STEEL PIPE

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 3, butt	51	37½

Iron.

(Prices adopted June 30, 1917 and reaffirmed Nov. 7, 1917.)

Diameter in inches.	Black. Per cent off	Galv. Per cent off
¼ to 1½, butt	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	53.50
Six-inch and over, Chicago	50.50
Four-inch, New York	59.50
Six-inch and over, New York	56.50
Four-inch, Birmingham	48.00
Six-in. and over, Birmingham	45.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	5.25c to 6.00c
Bands, Pittsburgh	5.10c to 5.85c
Shafting, Pittsburgh, carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh	5.35c
Rivets ⅞ in. and smaller, Pitts.	40 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter.)

Rolled thread	40 off
Cut thread	35 and 2½ off
Larger or longer	25 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	40 and 10 off
Cut thread	40
Larger and longer	30
Cold pressed, semi-finished, hexagon nuts	50 and 10
Gimlet and cone point lag screws	45

NUTS

Hot pressed, square, blank	1.70 off
Hot pressed, square, tapped	1.50 off
Cold pressed, square, blank	1.25 off
Cold pressed, square, tapped	1.00 off
Hot pressed, hexagon, blank	1.50 off
Hot pressed, hexagon, tapped	1.30 off
Cold pressed, hexagon, blank	1.25 off
Cold pressed, hexagon, tapped	1.00 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products November 7, average for October, 1917, average for August, 1917, and average for November, 1916. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Nov. 7, 1917.	Average prices Oct., 1917.	Aug., 1917.	Nov., 1916.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$55.55	$30.35
Basic pig iron, Pittsburgh.....	33.95	33.95	52.75	25.95
No. 2 Foundry pig iron, Pitts.	33.95	33.95	55.55	26.76
No. 2 Foundry pig iron, Chic..	33.00	33.00	55.00	25.00
Lake Superior Charcoal, Chicago	37.50	37.50	59.50	21.95
Malleable, Chicago	33.50	33.50	55.00	25.00
Southern, No. 2, Birmingham...	33.00	33.00	48.00	22.00
Southern Ohio No. 2, Ironton..	33.00	33.00	55.00	30.00
Basic, eastern Pa.....	33.00	33.00	51.00*	25.00
No. 2X Virginia, furnace.....	33.50	33.50	51.90	23.00
No. 2X foundry, Philadelphia...	34.00	34.00	53.40	25.00
Ferro mang., delivered.....	250.00	302.00	400.00	160.00
Bessemer billets, Pittsburgh....	47.50	58.75	93.00	52.00
Bessemer sheet bars, Pittsburgh	51.00	65.50	96.00	52.00
Open hearth sheet bars, Pitts..	51.00	65.50	96.00	52.00
Open hearth billets, Pittsburgh.	47.50	58.75	93.00	52.00
Steel bars, Pittsburgh.....	2.90	2.90	4.00	2.78
Steel bars, Chicago.....	2.90	2.90	4.50	2.90
Iron bars, Philadelphia.....	4.935	4.935	4.914	2.659
Iron bars, Cleveland, local del'y	4.25	4.50	4.75	2.70

*Not determined.

	Prices Nov. 7, 1917.	Average prices Oct., 1917.	Aug., 1917.	Nov., 1916.
Iron bars, Chicago mill.....	$4.50	$4.50	$4.50	$2.52
Beams, Chicago	3.00	3.00	4.95	3.00
Beams, Pittsburgh	3.00	3.00	4.50	2.88
Beams, Philadelphia	3.185	3.185	4.914	3.059
Tank plates, Pittsburgh.....	3.25	3.25	8.80	3.35
Tank plates, Chicago.....	3.25	3.25	9.60	3.45
Tank plates, Philadelphia.....	3.435	3.435	10.164	3.909
Sheets, blk., No. 28, Pittsburgh.	5.00	7.75	9.00	3.67
Sheets, blue anld., No. 10, Pitts.	4.25	7.875	8.50	3.30
Sheets, galv., No. 28, Pittsburgh	6.25	8.8125	10.25	5.07
Wire nails, Pittsburgh.....	3.50	3.875	4.00	2.85
Connellsville fur. coke.....	6.00	6.00	10.00	3.75
Connellsville fdy. coke.....	7.00*	6.00	12.50	5.50
Heavy melting steel, Pittsburgh.	30.00	31.50	34.60	20.55
Heavy melting steel, eastern Pa.	30.00	26.10	32.80	20.00
Heavy melting steel, Chicago...	30.00	27.00	33.10	19.35
No. 1 wrought, eastern Pa.....	36.75	40.80	46.24	23.50
No. 1 wrought, Chicago.....	35.00	31.88	35.40	21.25
Rerolling rails, Chicago.....	36.50	36.00	41.90	24.90
Car wheels, Chicago.....	27.00	25.88	30.70	15.95

(For Additional Prices See Page 1026)

Differentials Clarify Iron Market

Selling Expands as Definite Bases for Trading in All Grades is Established—Week's Turnover in Eastern Pennsylvania Totals 40,000 Tons—October Basic and Bessemer Sales in Valleys Reach 100,000 Tons

Philadelphia, Nov. 5.—Sales of pig iron in this district totaled at least 40,000 tons during the past week and were by far the largest for any week since Sept. 24, when the present arrangement of regulating prices by agreement became effective. The biggest business during the week involved basic, of which about 15,000 tons were sold for this year and next. All of this business went at $33, furnace. Sales of standard low phosphorus iron totaled about 3000 tons. This business was booked with the price left subject to adjustment; now that the differentials for the various grades of iron have been announced the price applying to these sales is $53, furnace. Some forge iron, some western malleable and several lots of off-bessemer were disposed of. The remainder of the week's business was in foundry, which went on the basis of $33, furnace, for No. 2 plain, $33.50 for No. 2X, and $34.50 for No. 1X. The largest individual seller was a Virginia maker, who last Wednesday again opened his book for first half. Up to today this interest had sold 9000 tons; of this 1200 tons went to a Richmond melter. Among current inquiries is one from the Pennsylvania railroad for 13,000 tons of first half foundry, the largest single lot to appear for some time. The Southern railroad, which is understood to have closed for a small tonnage is out for 500 tons of charcoal. Numerous other inquiries are pending for foundry, including a number for 500 to 1000 tons each. Several small inquiries for steelmaking iron also are out.

Deliveries Interest New England

Boston, Nov. 5.—Business in pig iron is not particularly active in this territory. While consumers are interested and making a good many inquiries, and a little business is being done at agreed prices, the bulk of the trade is more anxious about shipments on existing contracts. Shipments are moving this way with a fair degree of freedom save from Virginia points and the Alabama region. Embargoes and a car scarcity are interfering with the movement of iron from these sections. The attitude of the trade as a whole is a waiting one. On the latest proposal that existing contracts be abrogated the trade is really waiting with great interest, and the suggestion generally is deprecated. Such business as is being done consists of squeezing out a few cars from current production for regular customers, and $33, furnace, is the going price. Freights are unchanged with shipments from the Buffalo district taking $3.10 to Boston common rate points, eastern Pennsylvania $3.25, Virginia $3.48 and Alabama $6.40. It is hinted that Virginia shipments will have to pay a higher rate after the turn of the new year. The coke situation is still unsettled and will be until the government takes some action with regard to prices of foundry coke.

Italy Buys Bessemer Black

New York, Nov. 6.—The pig iron trade here has been set on an even keel by the announcement of price differentials for the various grades. Sellers now are making such corrections and revisions as are necessary to make sales of the past five or six weeks conform to the new schedule. It is expected, as a result of the definite establishment of prices on all grades, demand will show an improvement, particularly in the case

of low phosphorus iron in which a number of consumers have delayed closing. Incidentally, the new quotations of $50, furnace, for copper bearing low phosphorus and $53, furnace, for standard low phosphorus are $5 lower than was expected. The principal recent sale is one to the Italian government of 30,000 tons of standard bessemer. All of this, it is understood, is to be furnished by one maker. Numerous additional sales of foundry iron are reported. The largest is 2000 tons of northern No. 2X for shipment this year to an Elizabeth, N. J., consumer. Several smaller lots representing in some cases 500 to 600 tons each, have been placed both with Buffalo and eastern Pennsylvania furnaces. All these sales have gone on the basis of $33.50, furnace, for No. 2X, and $33 for No. 2 plain. Inquiries for 2000 tons of low phosphorus for an eastern Pennsylvania consumer, and 1000 tons of malleable for a New York state melter are unclosed. It is understood the Crane Co., Bridgeport, Conn., has closed for some foundry tonnage for this year. A Perth Amboy, N. J., melter recently closed for 5000 tons of basic for shipment this year.

Differentials are Satisfactory

Pittsburgh, Nov. 6.—Differentials fixed by the government on the various grades of pig iron follow precisely suggestions made to the war industries board by the committee of the American Iron and Steel institute having this matter in charge and, therefore, are satisfactory to the trade generally. Publication of the differentials has relieved the general uncertainty. Furnaces which have been holding back tonnages of grades on which differentials had not been officially fixed are expected to sell more freely. Basic and bessemer, as well as some foundry grades, however, have been moving in large tonnages. Furnaces producing these grades are now well sold up for the remainder of the year. Fair-sized tonnages of No. 2 foundry iron have been sold during the week. A sale of 2000 tons was made by a valley furnace to a Pittsburgh consumer at $33, furnace, for first half and is not subject to revision. Another sale of 1000 tons of first half No. 2 foundry also was made by a valley furnace to a Pittsburgh district consumer at $33 on a similar basis. The most interesting sale involved 1500 tons of special bessemer by a valley producer to a Pittsburgh consumer for five months delivery beginning with November. The price was $38.30, furnace. The iron is guaranteed and carries the standard silicon content of 1 to 2 per cent, but is low in sulphur and phosphorus with content of 0.025 and 0.09, respectively. The differentials over the bessemer price of $36.30, furnace, are based on the trade customs. Table of differentials provides "manganese, sulphur and phosphorus variations to be adjusted as formerly customary in each district having respect to the base price". According to the averages of W. P. Snyder & Co., sales of standard bessemer and basic iron of 1000 tons or more during October were made entirely at the government figures of $36.30 and $33, furnace, respectively, against $45.45 and $41.34, valley, for bessemer and basic, respectively, for September, 1917, and $23.65 and $20.30 for October, 1916. The sales entering into the October average totaled approximately 100,000 tons, of which about 65,000 tons were bessemer and 33,000 tons basic. This is understood to represent the largest monthly tonnage sold since last June.

One Maker Sells Freely

Buffalo, Nov. 6.—The past week has seen a lively line of inquiry and some good sales, though the selling appears to have been done principally by one furnace interest. This interest booked 10,000 tons, principally all No. 2 plain foundry grade at the government figure of $33, furnace. The bulk of this iron was for delivery over the first half of next year. This furnace has a very little tonnage for delivery this year. The brisk inquiry of the past week leads furnacemen to believe that there should be some spirited selling for delivery over the first half of 1918. One of the district interests which has done some consistent selling remained practically out of the market during the week, preferring to await further clearing of the situation.

Differentials Boost Selling

Cleveland, Nov. 6.—With the announcement of complete differentials on pig iron, many provisional contracts previously arranged are being formally closed. Makers now are going ahead and are selling various grades for delivery to July 1, 1918, at the fixed price and without further reservations. The inquiry is active and selling has been considerable. The Commonwealth Steel Co. has inquired for 12,000 tons of basic for the first half. For southern Ohio shipment, 1000 tons of early basic was asked. A recent sale to the Brier Hill Steel Co. called for 10,000 tons of early basic at $33, furnace. A local consumer is out for 1000 tons of high silicon malleable for first quarter. Foundry sales at $33, furnace, for 1.75 to 2.25 silicon and at determined variations for other grades are more numerous. Some local interests booked a more liberal tonnage in the week. Some inquiry for silveries for next year is current in this district Southern Ohio makers who last week announced a new first half schedule of $43, furnace, for 7 per cent and $46 for 8 per cent, or $1 to $1.50 above the official base, are expected to modify their quotations accordingly. Coke shortages continue to plague furnace operations and intermittent banking for a day or more at a time remains a drag on production.

Much Inquiry at Chicago

Chicago, Nov. 6.—Increasing inquiry for all grades of pig iron for all deliveries is being entertained by producers here. This has resulted in more or less selling, according to the ability of stacks to take on further business. Demand seems to be for malleable and basic, the former coming in lots of 500 to 1000 tons and the latter including two inquiries of 10,000 tons each from the St. Louis district. It is believed one of the latter will be closed shortly by a Chicago stack. Activity in malleable iron is resulting in some contracts for delivery during the first half of next year. Furnaces are inclined to take business more freely than formerly and sales of 250 tons to 500 tons for delivery next year have been booked recently at $33, Birmingham. Lake Superior charcoal is more active and tonnages are being closed constantly for next year.

Some Large Inquiries Out

St. Louis, Nov. 3.—Dealers in pig iron here report a gradually increasing volume of inquiries. Orders for small, scattering tonnages continue to pour in, many of them from points well outside the territory usually supplied from this center. The character of a large part of these inquiries indicate that the metal is needed badly. As has been the case for several weeks, the dealers are impotent to meet the demand. They declare the iron is not to be had. So far as could be learned sales were confined chiefly to a few odd lots. The largest transaction was 1000 tons of No. 2 foundry to a manufacturer in the city. In addition to the smaller one, some large inquiries have appeared. An east side mill is in the market for 10,000 tons of steelmaking iron for delivery over five months, and a manufacturer in western Missouri is seeking 8500 tons with as large a part as possible for shipment this year. According to most recent advices to St. Louis representatives, blast furnaces in the

Birmingham district have not a pound to apply on new spot business. They are shipping to regular customers on contracts and declare such deliveries are absorbing current outputs.

Foundry Inquiry Grows

Cincinnati, Nov. 5.—The inquiry for foundry iron is increasing. Melters, heretofore timid about closing for the balance of their first half requirements, are daily sending out inquiries and seem disappointed that sellers are not able to accommodate them. The prospect of an iron shortage next year causes customers to be more insistent and less particular about the brand wanted. This condition has caused inquiries to be sent broadcast. As far as this year's business is concerned buying is at an end and only odd lots that can be spared in different districts are changing hands. A number of sales of southern iron have been made at $33, Birmingham, for first half shipment. Virginia iron is also held at the same figure by all producers in that district, but the furnaces claim to have only a limited tonnage yet to be disposed of. Hanging Rock furnaces are shipping all the iron they can make on former contracts, and are slow about committing themselves very far ahead.

Denounce Abrogation Proposal

Birmingham, Ala., Nov. 6.—Sales of pig iron in southern territory at the government price of $33, furnace, for No. 2 foundry and basic, are small in the aggregate. Regular customers only are being accommodated by makers. Total sales of the past week were scarcely more than 5000 tons. Strict attention still is being given to production and delivery on old contracts. Another furnace was blown out the past week for repairs, the No. 3 furnace of the Sloss-Sheffield Steel & Iron Co., but another stack will take its place this week, the Trussvillle furnace. The railroad car shortage still is the subject of complaint and delays range from three to more than six weeks. The Republic Iron & Steel Co. still is out of the market and is giving old contracts full sway. No attempt is being made in the Birmingham district to evade in any manner the agreed prices. Discussion has been lively in this district over the proposal of the federal trade commission to abrogate contracts. Several strong replies have been forwarded the commission in response to inquiries as to the future raw material supplies and contracts. The concensus of opinion here is that the move is unjust, unbusinesslike and likely to upset business irreparably.

Consumers Can't Get Coke

Furnaces and Foundry Operations Continue to be Curtailed by Lack of Market Offerings—Car Supply Remains Poor

Pittsburgh, Nov. 6.—Appointment of Warren S. Blauvelt, Detroit, as a special assistant to Federal Fuel Administrator Harry A. Garfield, has created considerable discussion in this district. Particular interest was manifested in reports coming from Washington that his selection presages an early revision of coke prices. The significance of this report is not plain. By some the report, if true, is taken to mean that differentials on furnace and foundry grades will be determined in the near future, as has been urged by producers. Others express the opinion that it may mean a change in the established price of $6, Connellsville ovens. If there is any change made as to prices, it is believed that it will be downward rather than upward. Indications are, however, that the price will be left unchanged this year. It would not be surprising if the fuel administration soon provided a differential for different sizes of furnace coke, as well as for foundry fuel. Producers continue to accept extremely limited tonnages of spot coke and the sales principally are by the larger operators. Furnaces and foundries urgently are seeking prompt fuel, and owing to their inability to obtain requirements, are suffering greatly. Some foundries, a part of them engaged on government contracts, have been compelled to close down, and one furnace in the Wheeling district was banked a few days ago owing to a lack of coke. Other furnaces are getting into a desperate plight. Producers insist that they are unable to take spot tonnages, because they are operating on contracts. The car supply is also unsatisfactory, the general average for last week being about 60 per cent, while on the Monongahela railroad it was only 50 per cent. Production for the week ending Oct. 26 totaled 194,276 tons, as compared with 209,334 tons for the preceding week, according to *The Connellsville Courier*.

Consumers Pay Wage Rise

New York, Nov. 5.—Increases in wages of coke oven operatives are to be charged to consumers, according to notifications which have been received by numerous foundries in this district. In some cases, the cost of making coke has been increased more than 50 cents per ton due to the higher wages. By the terms of their contracts, which were entered in most cases several months ago, consumers are given the option either of taking coke at the increased price or of cancelling. Inasmuch as they find it impossible to make new purchases at the government $6 price, or any other price, cancellations would cut off supplies. The demand has aroused much indignation among buyers, who hold it is a violation of the spirit of the agreement with the government. Most of these contracts were booked at prices which net at least $8, and in most cases considerably higher at the Connellsville ovens.

Foundrymen More Uneasy

Cincinnati, Nov. 5.—This week marks the continuance of a coke situation that is apt to become intolerable at no distant date. Foundrymen are uneasy about the future, except where a supply of coke has been bought far ahead. Those who hold contracts made at premium prices have made no effort to cancel and risk getting a supply at the government's figure of $6, at oven. The seriousness of the situation is beginning to be realized with no reliable remedy thus far suggested. It is needless to add that contracting is at a standstill. Scattered sales of cars already loaded and ready to move are rare.

No Coke Offered in South

Birmingham, Ala., Nov. 6.—Southern coke is not being offered on the market despite the fact that some of the manufacturers assert that there is no government control or price schedule on the product in this section. Production is now greater than it ever was but there is no accumulation, as far as can be seen, except with two companies. There was some intimation recently that some sales of coke had been consummated on a basis of $12.50, ovens, but no verification could be obtained. Coal production has been steadily improving, but still under what could be done if labor would work longer per month and railroad car service was better. Coke output is greater and has been increased by the recent starting of additional by-product ovens of the Woodward Iron Co.

Much Business Ignored

St. Louis, Nov. 5.—There is absolutely no change in the coke situation at this district. Certain dealers who were selling at slightly above

the government figure have decided to discontinue that traffic. The demand is excellent, and a great tonnage could be sold were it possible to ascertain what would be a safe basis upon which the business could be made. The dealers say they cannot sell at $6 and cannot buy at that figure. Brokers who have contracted for material at as high as $7 and $8, ovens, are waiting in hopes of discovering some loophole through which they may possibly emerge unscathed.

Said one broker: "We are immensely handicapped by lack of information and detail as to how business can be handled, and what we can charge for material and service. Before the war it cost about 15 cents a ton to load foundry coke in box cars, now it costs 35 to 50 cents. Who is to bear this cost? What can we charge for the extra service?"

Big Shell Tonnage Closed

About 300,000 Tons Distributed Among Various Makers at Government Price—Semifinished Selling More Freely

New York, Nov. 7.—About 300,000 tons of shell steel for army purposes have been distributed. This tonnage is a part of the 1,500,000-ton order previously referred to by THE IRON TRADE REVIEW. The material will be rolled from 5 to 5½ billets into 6-inch rounds for which the government will pay the market price of $3.50 per 100 pounds. Allotments were made among the various mill in the Pittsburgh, ing to the capacity of the mills coning to hte capacity of the mills concerned. Producers who manufacture large quantities of shell steel received a larger percentage of the 300,000-ton order than the maker whose shell steel production is limited. As a whole the mills were well satisfied with the distribution. The entire allotment will be completed within 30 days.

Sell Sheet Bars at $51

Pittsburgh, Nov. 6.—Inquiries for billets and sheet bars in this district are numerous, but transactions are extremely limited. One sale of 300 tons of sheet bars at the government price of $51, Pittsburgh or Youngstown, was made during the week, the mill selling to a regular customer. No sales of billets involving tonnages of any consequence have been reported. Producers are well filled up with contracts and aside from the small tonnages that are being sold now and then to regular customers are not in the market for new business for this year.

Stripmakers Reduce

Pittsburgh, Nov. 6.—Manufacturers of cold rolled strip steel are anxious for the government to either fix a price on this product, or to announce definitely that it does not propose to do so. A great amount of private buying is being held back by reason of the uncertainty. Manufacturers have reduced the price of cold rolled strip steel to 7c which compares with 9c to 9.50c, the open market quotations which have been prevailing.

Inquiries Are Heavier

Cleveland, Nov. 6.—Inquiries for semifinished steel have been more numerous, but few sales are noted. A northern Ohio buyer inquired for 6000 to 9000 tons of slabs for first quarter for rolling into strip steel. A northern Ohio sheet mill inquired for 500 to 1000 tons of prompt sheet bars. Some odd lot sales of sheet bars are being made by the mills to regular customers at the government price of $51, Pittsburgh and Youngstown, as openings appear spasmodically on mill schedules. Special forging steel continues to be quoted around $105, mill, and some buyers have shown a willingness to pay this figure.

Downward Move

Still Shown in Ferroalloys—Government Regulation Very Remote

New York, Nov. 6.—Prices on the principal ferroalloys continue to be headed downward. Of these products, spiegeleisen continues to be most active. In addition to an inquiry previously mentioned for 12,000 tons for delivery over 1918 to Corrigan, McKinney & Co., new inquiries, involving 2000 to 4000 tons, mainly for first quarter, have come out. The market on spiegeleisen is easy at $67.50 to $70, furnace, for this year and $65 to $67, furnace, for first quarter.

Price fixing on ferromanganese as well as the other ferroalloys now is regarded as among the remotest possibilities. It definitely can be stated that government officials have no intention of seeking to regulate these prices for some time to come. Ferromanganese now is quoted at $250, delivered, both for this year and first half. One sale is understood to have been made at less. Inquiry, both for this year and first half, shows a slight improvement, but the total is not large.

Fifty per cent ferrosilicon is not living up to the firm tone reflected a week or two ago. Sales of prompt carloads have been made this week around $160 and less. The market for this year is $155 to $165, delivered. Prices for next year are nominal.

Market Remains Quiet

Pittsburgh, Nov. 6.—Quietness continues to prevail in ferroalloys. The tone is easier. Small lots of prompt ferromanganese, one of them involving between 200 and 300 tons, were sold in this district a few days ago at $250, delivered. Limited tonnages of bessemer ferrosilicon have been sold during the past week at the recently adjusted prices made by producers, as quoted last week in THE IRON TRADE REVIEW. These prices were cut slightly by the government.

Pipe Price

Represents Compromise of Existing Cards—Makers Modify Lists

Pittsburgh, Nov. 6.—The discount of 52 and 5 and 2½ per cent, Pittsburgh, established by the government on black steel pipe, base size, represents a compromise between the April 2 card of the National Tube Co., providing a discount of 56 per cent off, and of the May 1 card of independents, providing a discount of 50 per cent off. The June 18 cards of independents were advanced to 43 off. The government price represents $8.92, Pittsburgh base. Producers have conformed their levels to that established by the government and the National Tube Co. has prepared a 51 per cent card in accordance with trade custom by which the published card carries one point, 5 per cent and 2½ per cent under the published discount. This is the price at which the jobber buys. The government price represents an advance of $8 a ton over the April 2 card of the leading interest and a decrease of 2 points, or $4 per ton, under the May 1 card of independents. The published price of steel pipe is now 51 off for black and 37½ off for galvanized. Producers of iron pipe, as a result of the steel pipe price being fixed, have published cards continuing their June 30 prices of 33 off for black and 17 off for galvanized. These cards are published as of Nov. 7 and are merely meant to notify the trade that iron pipe prices remain unchanged. Considerable inquiry continues to come out but makers of

steel grades are so heavily booked that they are not able to take prompt business. Fair-sized tonnages of iron pipe are being sold. Lap weld grades are in particular demand. Producers are generally unable to accept large tonnages for shipment before next March or later.

Government Takes Tonnage

New York, Nov. 7.—Nearly all pipe bought heretofore by the government has been used for either sewerage purposes or steam and water lines, etc., at the various cantonments. The government now requires pipe for other purposes and has again entered the market. One large middle western pipe manufacturer has taken an order for 14,000 tons of 3-inch which will be used for trench mortars. The pipe, according to specifications, will be made from the best grade of skelp.

Cast Inquiry Small

Chicago, Nov. 6.—Inquiry for cast iron pipe continues light, but some small tonnages are coming out. A recent letting at Langdon, N. Dak., resulted in the United States Cast Iron Pipe & Foundry Co. being awarded 125 tons and the American Cast Iron Pipe Co. 100 tons. Bids were opened recently at Kansas City, Kans., on which no award has been made. Figures will be taken Nov. 7 at Kansas City, Mo., on 600 tons, and on Nov. 2, at Brigham, Utah, on 350 tons.

Want Iron Concessions

Birmingham, Ala., Nov. 6.—Cast iron pipe men met here during the past week and discussed iron market conditions as well as the pipe trade. While no formal statement was issued, it is understood some consideration was given to whether there should not be some differential for local consumption between the pig iron price at the furnace in the Birmingham district and at northern producing centers. Several specifications for pipe are being bid on and there is hope that the trade shortly will improve. Encouragement is heard of in the pipe business. Soil pipe and fittings still are lagging as building operations throughout the country are being held back.

Buyers Flood Sheet Mills

Announcement of Fixed Prices Turns Loose Heavy Inquiry—Mills Well Booked—War Orders Total 30,000 Tons

Youngstown, O., Nov. 7.—Sales managers in this district are now breathing a sigh of relief since the prices of sheets have been announced. Much irregularity had been shown by quotations for various grades of sheets the past two or three weeks and just what figures represented the exact market was one of the problems the producers could not solve. Since the newly announced prices have been sent broadcast, an exceptionally large volume of inquiries has been coming out. One maker states that inside of 24 hours after the announcement, he was deluged with telegrams and telephone calls from the domestic trade wanting his concern to cover requirements ranging anywhere from 100 to 1000-ton lots, much for early delivery. This situation has long been expected and came as no surprise. However, the majority of the sheet mills are well booked for this quarter, and just how they will take care of this new volume of business is not clear.

What business that is accepted cannot possibly be delivered until the first quarter of 1918, and then no definite date can be promised since the government's orders are given preference. These latter orders, a large percentage of which were allotted among the mills in this district, are estimated around 30,000 tons. At present the mills are turning out fairly large tonnages of black sheets, No. 28 gage, to be used for cook stoves in the cantonments and France.

Sheet Prices Acceptable to Trade

Pittsburgh, Nov. 6.—While prices established by the government on sheets are somewhat lower than it was believed they would be, the new levels have been accepted by the trade in good spirit. The price of 5c, Pittsburgh, on No. 28 black sheets is 50 cents per 100 pounds under the price established last April by the American Sheet & Tin Plate Co. for bessemer sheets, and 75 cents per 100 pounds less than the price it fixed for open-hearth sheets for last half delivery. The price of 4.25c f.o.b for No. 10 blue annealed is a considerable cut under the open market quotations which have been prevailing, as is also the price of 6.25c, Pittsburgh, fixed for No. 28 galvanized sheets. The sheet market, however, has been growing easier for some time, although during the past week there have been instances where premium prices were paid for fair-sized tonnages for prompt delivery. Black No. 28 has been quotable at from 5.50c to 6c, and blue annealed at a similar range, while No. 28 galvanized has been quotable at from 7c to 8c. It is reported that one sale of No. 28 black sheets was made recently at 7c, although this was an exceptional instance. Inasmuch as the trade has not determined upon the differential on tin mill black sheets, quotations on these grades are being omitted until that is done, if it is done at all. Manufacturers probably will open their books soon for 1918 business.

Sellers More Active

Cleveland, Nov. 6.—Softening of sheet prices had continued up to the announcement of the new government schedule on this product. Makers had been more active in soliciting business, apparently anticipating the reductions. No. 10 blue annealed was being quoted at 5½c to 6c, mill; No. 28 black at 6c and galvanized at 7c to 8c. An order for 500 tons of blue annealed sheets and light plates for stock work for merchant vessels for the allies has recently been placed.

Market Showed Weakness

Chicago, Nov. 6.—Much inquiry is being received for steel sheets of all grades. Quotations continued to soften up to the time of the government price announcement. An important maker in this territory was quoting 6.215c to 7.215c on No. 28 gage black, 5.715c to 6.215c on No. 10 gage blue annealed, and 7.715c to 8.215c on No. 28 gage galvanized. Other makers are quoting considerably under this level and taking most of the business.

Makers Satisfied

By New Government Price on Tin Plate—To Open Books

Pittsburgh, Nov. 6.—Producers of tin plate are satisfied with the price of $7.75 per 100-pound box, Pittsburgh, fixed by the government on bessemer and open hearth. This price represents an increase of 25 cents a box over that announced last April by the American Sheet & Tin Plate Co. for last half delivery. The requirements in connection with the food conservation program have been taking a good portion of the tin plate output, although tonnages for domestic consumption have been moving more or less regularly. Many inquiries are current now that the government has established a level. With the clearing up of the price-fixing situation, producers are expected to open their books soon for 1918 business.

Allies Placing Bar Lots

Order 5000 Reinforcing Rounds and Want 2500 Tons for Aircraft—Domestic Buyers Inquiring More Freely

New York, Nov. 7.—Inquiries are out from one of the allies for screw stock material which will enter into the construction of airplanes. The specification calls for hot rolled bars aggregating 2500 tons. This material is to be forwarded in the shape of rounds and hexagons varying in size from 17/32 to 2⅛ inches and from 1 to 1¼ inches respectively. Another of the allies through the United States purchasing commission has distributed among the various districts an order for 5000 tons of round reinforcing bars.

Inquiries Come Out

Pittsburgh, Nov. 6.—Inquiries for steel bars continue to come to manufacturers, but tonnages that are moving are extremely limited. Manufacturers are well booked and as a general thing are unable to make prompt shipments except in the few instances where tonnages are taken from stock.

Consumers Inquiring Freely

Cleveland, Nov. 6.—Various consumers of steel bars continue to inquire for first half. One requirement of 3500 to 4000 tons for a Cleveland user remains open. Another local inquiry for 1000 tons is unsatisfied. A Toledo spark-plug maker, who recently sought 10,000 tons and bought 2000 tons, has made no further purchases. It is believed more liberal selling at 2.90c, Pittsburgh, is imminent. Implement makers continue their efforts to obtain priority on their requirements as a war necessity. Reinforcing bars continue at 3.75c to 4c, mill.

Bar Market Quiet

Chicago, Nov. 6.—Practically no selling of soft steel bars is being done, as mills are unable to take on anything beyond actual government requirements and this almost prevents delivery on former contracts. Government needs are on the increase and are filling mills almost to the limit. Hard steel bars rerolled from rails continue to be quoted at 4.25c, with occasional local sales at 4.50c, Chicago. Some inquiry has been received recently for 1918 delivery, but no buying has been done. The wide spread between soft steel bars and the hard variety is unusual. It is expected later developments will bring readjustment. Bar iron continues at 4.50c, Chicago, with inquiry for prompt and next year's delivery. Only small sales are being made in view of the high prices compared with soft steel bars.

Sell to Regular Customers

Philadelphia, Nov. 5.—A few small tonnages of soft steel bars were sold during the past week for early shipment to regular customers at 2.90c, Pittsburgh. The makers generally are refraining from making any general offers, however, and concrete bars are the only bars tendered freely at the new price. Sales of iron bars continue to be made at 4.50c to 5c, Pittsburgh.

Puddling Costs Rise

Pittsburgh, Nov. 5.—An easier tone is reflected in the market for iron bars. While some producers are quoting 4.50c, Pittsburgh, it is believed that tonnages could be bought for 4c, Pittsburgh. Demand is so slight that the market has not been tested. Nothing has developed here as to what the government may do regarding the fixing of a price on bar iron. The wages of puddlers advanced on Nov. 1, following the bi-monthly examination held last week, which showed that the average sales for bar iron for September and October were on a 2.85c card, giving puddlers a wage increase of 50 cents a ton. This established the highest rate in the history of the trade, $13.80. Bar mill workers received an advance of about 4 per cent. Puddlers received $13.30 a ton during September and October, which previous to the latest adjustment was the highest wage they ever were paid. There is virtually no demand for muck bar and it is difficult to fix a market price on this product, although it is perhaps most nearly represented by $75 a ton.

Expect Shafting Buying

Pittsburgh, Nov. 6.—With the fixing of 17 off on shafting against 10 off which was the former market, many buyers who were holding off purchases are expected to release their requirements. Demands for large tonnages are to be made soon by the Emergency Fleet corporation and the war department. Makers are well booked with contracts.

Buys Nuts, Bolts and Rivets

Pittsburgh, Nov. 6.—Orders involving sizable tonnages are being placed by the war department for nuts and bolts for shipment to France and tonnages of rivets are being taken by the Emergency Fleet corporation. Due to the government regulated price of 2.90c on steel bars the prices at which the government is obtaining nuts, bolts and rivets are from $5 to $7 a ton below the open market. Producers are able to make these concessions in view of their ability to obtain steel bars at the reduced figure. They report, however, that they have not been able to obtain steel bars for prompt shipment to apply on domestic orders for nuts, bolts and rivets. In consequence prices being paid by private consumers are higher than those being paid by the government.

Hoops Sold at 6c, Pittsburgh

Pittsburgh, Nov. 6.—Sales of hoops in lots of from 200 to 300 tons have been made in the Pittsburgh district during the past week at 6c, base, mills, for last quarter, the principal consumers being coopers in the oil barrel trade. Some producers are quoting 5.25c, mill, but tonnages at this level are reported to be extremely scarce. There is also a wide range on bands, which are quoted at 5.10c to 5.85c, Pittsburgh. The market for bands is extremely quiet. Mills ordinarily engaged in the production of bands are doing cold rolling and auto parts manufacture. It is understood that manufacturers of wheels of automobiles are diverting their capacity to the production of aeroplane wheels. Hoop and band makers have not yet opened their books for 1918.

Cotton Tie Market About Over

Pittsburgh, Nov. 6.—Extreme quietness prevails in the market for cotton ties, the November price for which is $2.15, Pittsburgh. Some manufacturers will have completed their rolling for the season by the middle of the present month. Some mills which are engaged steadily in producing cotton ties will begin rolling in January for 1918 requirements which developed in June.

Belgium Buys Arms Plant

The plant of the Hopkins & Allen Arms Co., Norwich, Conn., has been sold to the Belgian government, which assumes all incumbrances amounting to about $4,000,000. It is expected that within a short time it will be turned over to the Marlin-Rockwell Arms Co., which will enlarge it, complete the Belgian government contract for rifles at a somewhat higher figure than the original contract called for. The plans of the Marlin-Rockwell Co. are to erect a large addition and increase the num-

ber of employes from 1200 to about 2500, if the plant is bought by the company. The addition will cost from $800,000 to $1,000,000. After completing the Belgian government order, the company will make 25,000 of the Browning type of machine guns for the United States government.

Ore Shipments

From Lake Superior District Fell Off Heavily Last Month

Shipments of iron ore from the Lake Superior district dropped sharply in October, further complicating the problem of furnishing, to blast furnaces tributary to the Great Lakes, sufficient ore to carry them through the closed navigation season this winter. The problem probably will be solved satisfactorily, however, as enough ore already has been moved to keep all furnaces in operation, provided the ore is properly distributed.

The shipments from upper lake ports in October aggregated 8,193,892 tons. This total was 1,300,000 tons less than the September mark of 9,536,152 tons and 922,000 tons under the mark of 9,116,196 tons set in October, 1916.

The movement up to Nov. 1 is 3,679,248 tons behind last year's record. The comparative decline on Sept. 1 was 2,756,944 tons and on Aug. 1, only 2,692,310 tons. In the last two months the lake fleet has moved 1,000,000 tons less than in the same period last year, while in June, July and August the fleet gained 920,000 tons on its last year's record.

The 60,000,000-ton mark for the season is practically certain to be reached. The fleet must move 5,750,000 tons during November and December, as the total shipments to Nov. 1 total 54,253,598 tons. In November last year the shipments were 5,715,000 tons and in December, 1,085,900 tons, a combined total of 1,050,000 tons more than is required to push the 1917 total over the 60,000,000-ton goal.

Detailed shipments by ports follow:

Port	October, 1917	To Nov. 1, 1917
Escanaba	995,052	6,162,774
Marquette	461,284	2,870,100
Ashland	978,029	6,603,238
Superior	1,876,525	12,253,271
Duluth	2,497,629	17,686,997
Two Harbors	1,385,373	8,677,218
Totals	8,193,892	54,253,598
1917 decrease	922,304	3,679,248

E. Lindsay has been named assistant master mechanic of the Atlantic, Quebec & Western railroad, with offices at New Carlisle, Que.

Plate Offerings Increase

More Producers Now Accepting 3.25c Mill From General Trade—Japanese Shipments to Pacific Coast Will be Barred

Pittsburgh, Nov. 6.—Car manufacturers and other consumers have been able during the past week to place orders for plates at the government price of 3.25c, Pittsburgh. Tonnage is moving more freely than it has been since the government fixed a level on this product and is being taken by consumers who are engaged on both government and private contracts. The government has placed an order during the past week for 5000 cars for various types for shipment to France. Originally the government had asked for 10,000 cars. While the distribution has been made, details regarding it are being withheld by manufacturers at the specific request of the government.

Can't Ship to Coast

New York, Nov. 6.—A date shortly will be set, it is understood here, after which no more plates can be shipped to the Pacific coast for storage at coast ports by Japanese buyers. Owing to the fact that export embargoes cannot be obtained, this steel can be moved no farther toward Japan than the Pacific coast. Government officials desire hereafter to conserve transportation facilities by preventing these plates from starting on their long journey across the country.

3.25c Offerings Increase

Philadelphia, Nov. 5.—At least three leading eastern Pennsylvania platemakers have made sales of moderate sized tonnages during the past week at 3.25c. In some cases this business is understood to have been booked at this figure, f.o.b. mill, and in others this price was based from Pittsburgh; although the bulk of the sales involved universal plates, some of it was for sheared plates. Two Pittsburgh district mills also offered at 3.25c, Pittsburgh, in this district during the week. One sale by an eastern mill during the week called for several thousand tons; with this exception the business generally was in small lots.

Offering Universal Plates

Cleveland, Nov. 6.—Certain eastern makers have continued to dispose of universal plates in this district and have been quoting 3.25c, Pittsburgh price, plus their freight advantage for eastern shipment. This means a figure of 3.43½c, mill. Other makers buying their steel in the open market have continued to accept business at 6c, mill, and higher against their higher cost material. An inquiry for the steel for 40 hoisting boilers for merchant ships is current.

Government Takes More Tonnage

Chicago, Nov. 6.—Further distribution of material for ship fabrication by independent shops is being made by the government, to be shipped to shops on the Pacific coast and through territory near Chicago. This material is understood to be for destroyers and for the merchant fleet to be built under government direction.

More Cars

Placed for French Government—12,000 Tons Additional Rails Wanted

New York, Nov. 6.—Orders for 9000 cars for the French government were distributed at Washington last week among the principal builders in this country. These orders brought the total number of cars placed in October up to 46,300. October business included 5250 cars for the United States government; 30,000 cars for Russia; 9000 cars for France and 1000 cars for the Illinois Central railroad. As previously reported, 5250 cars for the United States government are for military use in France.

Inquiries for an additional 12,000 tons of rails for military purposes in France were put out from Washington during the past week. An order for 2000 to 3000 tons for equipping the quartermaster's depot at Port Newark terminal, New Jersey, was placed, it is understood, with the Cambria Steel Co. Several moderate tonnages of rails were sold in the east to industrial companies during the week at $80 to $85, mill.

Car Buying is Slow

Chicago, Nov. 6.—Although considerable inquiry has been current recently from the railroads for rolling stock, it is difficult to place this business because of the inability of mills to furnish steel. Priority claims have piled up to such an extent that even material as much needed as for cars is difficult to place. The Illinois Central railroad is inquiring for 300 flat cars and the Western Pacific for 300 coal cars. The Illinois Central railroad is also asking figures on repairs for 1000 cars.

More Contracts Being Let

Structural Bookings of Commercial Character Growing in West —More Ship Tonnage is Being Placed

Chicago, Nov. 6.—After a period when structural lettings were at a minimum and practically nothing of importance came out, a number of tonnages of sufficient total to be of note have been placed. The largest involves 446 tons for a forge shop building for the International Harvester Corp., Milwaukee. About 3500 tons are involved in the proposed theater building at State and Lake streets, Chicago, but difficulties in transportation may hold up this project. Some additional tonnage of shapes and plates has been awarded the leading independent to be furnished to fabricating shops in the west for shipbuilding under government direction. It is believed this material is going into destroyers.

Shipyard Steel Predominates

Philadelphia, Nov. 5.—The only structural tonnage which developed here during the past week is for a plate and angle shop to be erected at Hog Island, Philadelphia, for the American International Shipbuilding Corp. For this job about 3000 tons will be required. This interest also continues in the market for 6000 to 7000 tons for the construction of shipbuilding towers; it also wants various smaller tonnages for crane runways, etc. Another eastern mill has made sales of plain shapes during the past week at 3c, base, Pittsburgh, but only to regular customers here and there. Only one mill so far has been offering generally at this figure.

Fabricators Are Kept Busy

Pittsburgh, Nov. 6.—Fabricators in this district are kept busy on old contracts and are taking virtually no new business. During the past week some fair-sized tonnages of shapes at the government price of 3c, Pittsburgh, have moved, representing the first activity of consequence in this market since the government level was fixed.

Gets Big Priority

Buffalo, Nov. 6.—The Lackawanna Bridge Co., through its affiliated interest, the Submarine Boat Corp., has secured priority certificates on 85,000 tons of steel plates and shapes for building 50 merchant boats.

CONTRACTS AWARDED

Forge shop building for International Harvester Corp. at Milwaukee, Wis., 446 tons, to Morava Construction Co.

Office building for H. P. Hynde, Cheyenne, Wyo., 249 tons, to Omaha Structural Steel Company.

Paint shop for United States government at Mare Island, Cal., 203 tons, to Western Iron Works.

Chinese Bank building, San Francisco, Cal., 200 tons, to Central Iron Works.

Addition to Hotel Stewart, San Francisco, Cal., 200 tons, to Central Iron Works.

Shop for St. Louis Briquette Machine Co. at St. Louis, Mo., 144 tons, to Scullin Steel & Iron Co.

Machine shop for the Wellman-Seaver-Morgan Co., Akron, O., 680 tons; to the Fort Pitt Bridge Works.

Extension Lynn, Mass., plant of the General Electric Co., 1000 tons, to the American Bridge Co.

CONTRACTS PENDING

Foundry and cleaning room for the Standard Steel Casting Co., Cleveland, 600 tons; bids being taken.

Theater building, State and Lake streets, Chicago, 3500 tons.

Independents Cut

Their Price on Wire Products to Meet New Fixed Schedule

Pittsburgh, Nov. 6.—Independent manufacturers in the Pittsburgh and Youngstown districts today announced reductions in prices of wire and wire products, meeting the levels recently announced unofficially by the American Steel & Wire Co. The new schedule becomes operative at once and manufacturers have sent out notices to their agents of the changes made. The new schedule provides the following prices to jobbers: Wire nails, $3.50, Pittsburgh, per keg; annealed fence wire, $3.25, Pittsburgh (price fixed by the government); galvanized wire, $3.95, Pittsburgh; polished staples, $3.65, Pittsburgh; painted barbed wire, $3.65, Pittsburgh; galvanized barbed wire, $4.35, Pittsburgh; galvanized staples, $4.35, Pittsburgh. In all products, except annealed and galvanized wire, these figures represent a reduction of 50 cents. In annealed and galvanized wire, the decrease is 70 cents. It is understood that independents also are preparing to announce a price of $3.45, Pittsburgh, for manufacturers' wire, as in the unofficial schedule of the American Steel & Wire Co. The new adjustment is expected to settle trade conditions by bringing about price uniformity and to result in tonnages moving more freely. Orders continue to be placed by the government for wire nails and total war orders up to the present time are estimated at 250,000 kegs. The greater portion of this business was placed directly. Makers are taking fair-sized tonnages of barbed wire for shipment to the northwest and Canada before the close of navigation.

Arranging Specialty Schedules

Cleveland, Nov. 6.—Makers of wire products interpret the $3.25 price on plain wire as applicable to plain fence wire. Accordingly, they expect the wire nail price to jobbers to be $3.50, Pittsburgh. Early fixing by the mills of the price of numerous wire specialties which have been in confusion, is being provided for. Boltmakers also are drawing up their schedules. Tack producers are doing similarly. Local boltmakers have been inquiring for the first half wire needs. Flat wire is slack showing the influence of the reduced demand from automobile and bicycle manufacturers.

Warehouse Prices

Are Being Adjusted to Conform to New Mill Bases

Cleveland, Nov. 6.—Jobbers are adjusting prices on warehouse sheets to conform with the lately announced government schedule. Prior to the announcement of the government prices on sheets one dealer made price reductions as follows: No. 28 black, from 8.50c to 6.75c; No. 28 galvanized, from 10c to 8.25c, and No. 10 blue annealed, from 8.50c to 6c.

Boston Demand Good

Boston, Nov. 5.—There continues to be a good general movement of iron products from the local warehouses. Nothing stands out conspicuously active, the demand embracing practically everything in stock. Prices show no change from those of a week ago. Stocks in most lines are rather depleted. Warehouse quotations follow: Plates, narrow, 8.50c, ship, 11.50c; structural shapes, 6.50c to 7.50c; steel bars, 5.50c; iron bars, 5.50c; No. 28 black sheets, 8.70c to 10c; No. 28 galvanized sheets, 9.70c to 12c; No. 10 blue annealed sheets, narrow, 8.60c; wide, 10.60c.

Bars Hold Firm

Detroit, Nov. 5.—Warehouse prices on bars and shapes in the Detroit district remain unchanged. Other warehouse quotations are as follows: Plates, 7c; hoops, 6.50c; No. 28 galvanized, 8.50c; No. 28 black, 7.50c, and blue annealed sheets, 8c.

Plates Ease Off

Philadelphia, Nov. 5.—Prices on plates out of warehouses in this city have eased of ½c and now may be obtained around 8.50c, base.

Buying of Scrap is Heavy

Leading Consumer Credited With Taking 100,000 Tons—Fixing of Prices on Four Grades Expected to Heighten Movement

FOR COMPLETE SCRAP PRICES SEE PAGE 1026

Buffalo, Nov. 6.—Announcement of government fixed prices of $30 a gross ton for heavy melting steel, $20 for cast borings and machine shop turnings and $35 for No. 1 railroad wrought scrap is expected to heighten an already strong buying movement in this district. Dealers report sales of considerable tonnages of heavy melting steel, and further inquiries for large tonnages are out. The quotation before the government set prices was $27.50 to $29, or practically $1 more than last week. This picking up of the market is coincident with the reported requirement by the leading interest of the country of a tonnage of heavy melting steel said to have been 100,000 or more within the past week. Simultaneously other mill interests at Youngstown are understood to have bought 50,000 tons during the same period. Little if any of this scrap came out of Buffalo district, due principally to the fact that transportation facilities are almost prohibitive. The scrap was for Pittsburgh and Youngstown delivery. The price is said to have been $30, delivered. Inquiries are out for large tonnages of low phosphorus scrap. The price of this grade has risen from $38 to $39-$40. The labor shortage in district scrap yards remains acute.

Boston Market is Readjusting

Boston, Nov. 6.—The market for iron and steel scrap is dull and largely nominal. The trade has been waiting for some announcement with regard to fixed maximum prices and in the meantime dealers, both large and small, have been doing little. Prices now are going through a process of readjustment to conform to the new government scrap schedule. Wholesale dealers were paying the following prices per gross ton f.o.b. cars, shipping point, before the government announcement: Wrought No. 1 yard long, $29 to $30; horseshoes, $29 to $30; cotton ties, $20 to $21; stove plate, $19 to $20; machinery No. 1, $33 to $33.50; No. 2, $28 to $29; car axles, iron, $45 to $46; steel, $38 to $40; rerolling rails, $34 to $35; iron boiler plates, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, $24 to $25; steel rails, $25 to $26; No. 1 railroad steel, $25 to $26; heavy melting steel, $24 to $25; axle turnings, $18 to $19; machine shop turnings, $15 to $16; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, $30 to $32.

Prices Meet Expectations

New York, Nov. 6.—The government prices on leading grades of iron and steel scrap are considerably higher than recent market figures here. Because of today's holiday the market has had no opportunity to become adjusted to the fixed prices. The new figures are as high as expected. The government quotation of $30 on No. 1 heavy steel is 10 per cent less than the price on pig iron, although this percentage becomes greater in the case of the dealer, by reason of the freight rate which he has to pay on scrap; in other words, the new scrap prices are based on delivery at consuming points, while the pig iron prices are on a furnace basis. Demand has been exceedingly dull. The only change in prices is in wrought pipe.

Cast Scarp in Demand

Philadelphia, Nov. 5.—Before the new prices were announced yesterday practically the only development of interest in the scrap iron and steel market here was a fairly active demand from some of the large eastern steel plants for cast scrap. These interests have bought considerable stove plate, car wheels and other cast scrap to use as a substitute for basic pig iron. This business comprised most of the week's activity. A few sales of heavy melting steel were made at $27, delivered eastern Pennsylvania, but these involved less than 1000 tons each. Demand from the rolling mills was less active and from the foundries was comparatively nonexistent.

Scrap Prices Surprise

Pittsburgh, Nov. 6.—Prices fixed on iron and steel scrap by the war industries board created surprise in this district. They are higher than expected and are above levels which have been ruling in the open market. Well-informed dealers say, however, they are in complete conformity with the relationship that has been existing for several years past with regard to the price of basic pig iron. The government figure of $30 on heavy melting steel is from $1 to $2 above the figure at which some fair-sized tonnages of this grade recently have been sold, although the maximum of $30 had not disappeared. The price of $35 for No. 1 railroad wrought also is about $1 over recent sales, and the same may be said of machine shop turnings and cast borings. It is assumed that differentials on other grades will be adjusted by the trade itself. It is doubtful, however, if any revision of importance will be called for, in view of the fact that present prices on other grades line up well with those on which prices have been fixed. Some fair-sized tonnages were closed during the past week, particularly heavy melting steel. One of the largest consumers in this district, it is reported, is about to come out for a heavy tonnage of heavy melting steel.

No Radical Changes Likely

Cleveland, Nov. 6.—The new prices set by the government on heavy melting steel, cast borings, machine shop turnings and No. 1 railroad wrought, announced last night, have not yet been digested by the scrap trade in this territority, and so the general price list, with the exceptions noted, is practically unchanged; it is not believed that any radical changes will result. Readjustments here and there are expected to be the rule. Rejections of scrap by consumers appear to be decreasing, mainly because of the thorough establishment of the railroads' system by which a permit must be procured for every car. It is believed here that the working out of an inspection system such as proposed by the American Board of Scrap Iron Dealers will be very difficult. A great number of inspectors and adjusters would be necessary under former conditions, when hundreds of cars were rejected every day, but the trend is toward fewer rejections, which of itself will do much to simplify the problem.

Chicago Market Stronger

Chicago, Nov. 6.—Buying during the past week of heavy melting and other grades of steel by the leading interest, aggregating 10,000 tons or more, has brought the general level of the scrap market upward. The quotation on heavy melting steel just before the price-fixing announcement yesterday was $28.50 to $29, and it is understood that recent buying was at the higher figure. This buying has had the effect of bringing shoveling steel sharply upward to the same level as heavy melting, wiping out the spread which has existed for some time. Other consumers, although in need of further material, are seeking to put off buying as long as possible, and the result is that the market is fairly quiet.

Federal Price Fixing is Completed

Announcement Made by War Industries Board of Agreed Maximums in Sheets, Wire, Tin Plate, Steel Pipe, Cold Rolled Steel and Scrap—Further Prices to be Left to Trade's Own Adjustment

NO further announcements of agreed prices on iron and steel products are to be made by the government. The official base schedules on sheets, tin plate, cold rolled steel, plain wire, steel pipe and iron and steel scrap which were approved by the President and made public by the war industries board Tuesday represent the final act of the government on its own initiative, in the price regulation program. The products covered by the latest statement and those in the announcements of Sept. 4 and Oct. 11 will be as far as the federal authorities think it will be necessary for them to go. Prices on other finished steel products and other materials of the iron and steel industry are to be left for adjustment to the trade and this undoubtedly will be carried out by the American Iron and Steel institute in the same manner that the differentials on pig iron were fixed and made public during the past week.

New Government Prices

Finished Steel

Wrought steel pipe, ¾ to 3-inch, black	52 and 5 and 2½ off Pittsburgh
Cold rolled steel	17 off from March 15, 1915, list, Pittsburgh
Sheets No. 10 blue annealed	$4.25 Pittsburgh, per 100 pounds
Sheets No. 28 black	$5.00, Pittsburgh, per 100 pounds
Sheets No. 28 galvanized	$6.25, Pittsburgh, per 100 pounds
Coke tin plate, base	$7.75, Pittsburgh, per 100 pounds
Plain wire	$3.25, Pittsburgh, per 100 pounds

Old Material

No. 1 heavy melting steel	$30 per gross ton, f.o.b. consuming point
Cast iron parings	$20 per gross ton, f.o.b. consuming point
Machine shop turnings	$20 per gross ton, f.o.b. consuming point
No. 1 railroad wrought	$35 per gross ton, f.o.b. consuming point

Open Market Cut Sharply

The latest prices to which official sanction has been given by the government similarly to those in the two previous announcements represent deep cuts in the open market levels before the federal price-fixing program was launched in September. This is particularly true of sheets, the average prices of which for September were $8.75, Pittsburgh, per 100 pounds for No. 28 gage black; $8.50, Pittsburgh, for No. 10 gage blue annealed, and $9.70, Pittsburgh, for No. 28 galvanized, against $5, $4.25 and $6.25 respectively in the agreed schedule. Tin plate in September nominally was quoted from $10 to $15, Pittsburgh, per 100 pounds base box compared with $7.75 the agreed price; shafting at 5 off compared with 17 off; steel pipe at a maximum of 42 off compared with 52, 5 and 2½ off to jobbers or 51 off to the general trade at the government figure. September average prices on heavy melting steel scrap were $32.80, eastern Pennsylvania, and $34.60, Pittsburgh, against $30, the government price; No. 1 railroad wrought $35, Chicago, and $46.25, eastern Pennsylvana, compared with $35, the agreed price; and borings and turnings from $22 to $23.50, Pittsburgh, from $19 to $23, eastern Pennsylvania, and from $18 to $21, Buffalo, as contrasted with $20 in the new official schedule.

Those prices still to be adjusted by the trade are to follow the same standard as the prices already in effect and are to be made promptly. The war industries board in its official announcement on this point, says as follows:

"The iron and steel manufacturers have agreed promptly to adjust the maximum prices of all iron and steel products other than those on which prices have been agreed upon, to the same general standard as those which have been announced. It is expected that this will be done promptly and consistently in line with the basic, intermediate and finished products, for which definite maximum prices have been established."

The new prices like those previously announced are subject to a complete revision around the beginning of next year.

Government prices on heavy melting steel, cast iron borings, machine shop turnings and No. 1 railroad wrought, came as a surprise to most of the trade, in that they are above the prevailing levels and because it had been reported that the war industries board had definitely rejected $30 for heavy melting steel. Scrap, therefore, is the first of the iron and steel lines to be revised upward by the government, and evidently the first line in which the recommendations of the trade were adopted substantially without modification. Immediately before the prices were announced heavy melting steel was quoted at Chicago at $27 to $27.50; Pittsburgh, $28 to $30; Cincinnati, $24.50 to $25; Birmingham, $19.50 to $20; Philadelphia, $25 to $27; Cleveland, $26.75 to $27.50; Buffalo, $27 to $28; St. Louis, $27 to $28; New York, $24.

Talk of Coffin For Head of Munitions Work

Washington, Nov. 6.—The chairmanship of the war industries board, vacated through the resignation of Frank A. Scott, has not been filled and, according to a presentiment in some quarters, may not be until after congress convenes. Then many believe there is likelihood the President will ask for creation of another portfolio for the cabinet to handle the broad problem of munitions. Whether this is to be the case or whether the war board is to continue, there is one man whom rumor mentions for the place and he is Howard E. Coffin. Mr. Coffin was one of the pioneers in preparing industry, or at least in informing the country of what industry could do in the event the United States went to war. He already is a member of the advisory board of the council of national defense, the parent body of the war industries board. Originally he was a member of the naval advisory board. Then he was put in charge of the munitions division of the council. Mr. Scott was chairman of the general munitions board which was under Mr. Coffin. Reorganization of the council put Mr. Scott in a more advantageous position and Mr. Coffin kept to his post

as chairman of the aircraft production board.

While it is not known what steps are being taken to fill the vacancy in the board, it is known Judge R. S. chairman, has been offered the post. It is also understood he has refused it. There is a feeling openly ex-Lovett, vice chairman and acting pressed here that other members of the board are not qualified for the leadership and that some of the present incumbents should be removed.

Coke Differentials Being Given Consideration

Washington, Nov. 6.—The question of differentials on coke now is being considered by the fuel administration. It was intimated today that in the near future the present price of $6, Connellsville ovens, would be cut to $5, Connellsville ovens, but this is denied in another quarter. The fuel administration admits the coke situation as affecting the blast furnaces and steel mills is serious.

Warren S. Blauvelt, of Detroit, formerly consulting engineer of the Semet-Solvay Co. has been appointed coke director under Fuel Administrator Garfield. R. H. Knode, of the National Fuel Co., Pittsburgh, will handle the fuel needs of the steel mills.

Places Twelve Ships and Steel for Them

Washington, Nov. 6.—Contracts for 12 steel ships, each of 5000 tons capacity, were placed last week by the Emergency Fleet Corp. with the Jahncke Shipbuilding Co., New Orleans, which has ordered its steel from the Virginia Bridge & Iron Co., Roanoke, Va. It is said these vessels will be built and completely equipped in the New Orleans yard. The Jahncke company has no yard at present, but has given the shipping board every assurance one will be constructed immediately. It was pointed out to the board that a shipyard on the gulf of Mexico could get steel from southern mills and use railroads of the south, thereby avoiding congestion caused by heavy traffic no northern lines. Labor competition is said to be less keen in and around New Orleans. It is estimated the yard and ships will involve an expenditure of $10,000,000. Requirements of cranes, machinery, tools, etc., have not been made public.

The plant at Gloucester City of the New Jersey Shipbuilding Co., organized some time ago by interests controlling the Pennsylvania Shipbuilding Co., is more than half completed. The company expects to lay keels of at least three vessels within the next two months.

Expects Slag Ruling

Pittsburgh, Nov. 5.—It is reported here that within the next few weeks the public service commission of Pennsylvania will hand down a decision in the slag rate case affecting furnace interests in western Pennsylvania. The case has been long drawn out and its details have been fully published. Briefly, it grew out of efforts on the part of railroads to require furnaces to pay a rate of 20 cents a ton for hauling slag. The interstate commerce commission has held that the railroads had the right and should charge for hauling slag. The superior court of Pennsylvania reversed the finding and sent the case back before the Pennsylvania commission for reconsideration.

Fix Pig Iron Differentials

CHAIRMAN E. H. GARY, in behalf of the general iron and steel committee of the American Iron and Steel institute, has announced the long-awaited schedule of differentials for various grades of pig iron figured upon the base price of $33, furnace, for No. 2 foundry and basic. The complete official announcement is as follows:

"By agreement between the general committee on steel and steel products of the American Iron and Steel Institute, and the war industries board, approved by the President, the base price of No. 2 foundry iron and also of basic iron was fixed at $33 per gross ton, f. o. b. cars, furnace. From these base prices, the sub-committee on pig iron, iron ore and lake transportation has reported to the general committee a list of differentials which the general committee believes is fair and reasonable and in accordance with the usages of the trade, and therefore recommends to the iron industry that the same be adopted to take effect immediately. It is hoped there will be no hesitancy in accepting this recommendation. The list follows:

"The grade of No. 2 foundry iron to be equivalent in analysis to:

"Silicon	1.75 to 2.25
"Sulphur	Not over .05

"No. 2 soft southern iron equivalent to No. 2 foundry of same silicon content.

"Differentials from the above base price for No. 2 foundry iron to be made for the following changes in specifications:

"Forge or mill iron		$1.00 per gross ton under base
"Foundry iron running silicon	1.00 to 1.75—	.50 " " " " "
" " " "	2.25 to 2.75—	.50 " " " over "
" " " "	2.75 to 3.25—	1.50 " " " " "

"Foundry iron in excess of 3.25 silicon, add $1.00 per gross ton for each ½% of silicon over the price for 3.25 silicon iron.

"Manganese, sulphur and phosphorus variations to be adjusted as formerly customary in each district having respect to the base price.

"Where iron is sold by fracture, the usual grading prevailing in each district to continue:

"Malleable iron	$0.50 per gross ton above base
"Bessemer "	10% " " " " "
"Basic "	Base price

CHARCOAL IRON:

"Southern or warm blast charcoal iron, a maximum of $10.00 per gross ton above base for iron ranging 0.40 to 0.60 phosphorus, and silicon 1.00 to 2.00.

"For grades running below these analyses, corresponding reductions as usual to the trade to be made.

"Cold blast charcoal iron, a maximum of $22.00 per gross ton above base with customary reductions for lower grades, as recognized by the trade.

"Lake Superior iron, $2.50 per gross ton above base for iron averaging 1.25 silicon. Other grades to be adjusted as per the custom of the trade depending upon the silicon, phosphorus and manganese contents of the iron.

"All of these charcoal iron differentials to be considered in connection with the base price.

HIGH SILICON OR SILVERY IRON:

"For iron containing:

6% silicon	$7.00	per gross ton above base
7% "	9.00	" " " " "
8% "	11.50	" " " " "
9% "	14.00	" " " " "
10% "	17.00	" " " " "

"$3.00 per gross ton advance for each 1% silicon for 11% and over.

BESSEMER FERRO SILICON:

"For iron containing:

10% silicon	$22.00	per gross ton above base
11% "	25.30	" " " " "
12% "	28.60	" " " " "

LOW PHOSPHORUS IRON:

"Iron containing phosphorus and sulphur not exceeding 0.04, and silicon not exceeding 2%:

"For copper bearing iron	$17.00 per gross ton above base
"For copper free iron	20.00 " " " " "

"A sliding scale of $1.50 per gross ton advance for each reduction in phosphorus of 0.005% below 0.04, and $1.75 per gross ton advance for each 1% of silicon in excess of 2%."

More Inquiries

At Pittsburgh—New Pipe Cards—Pig Iron and Plates Sold

Pittsburgh, Nov. 7. (By wire.)—Inquiries are coming more freely to the iron and steel industry for all lines of products, and are attributed to the stabilizing effect on the trade arising from the winding up of the government's price-fixing program. After becoming adjusted to the new schedules, the selling movement will probably become more active. Comparatively little prompt business can be taken, however, owing to the sold-up condition of the mills.

The National Tube Co. has published new cards on pipe, the one on standard pipe carrying a 51 per cent discount on black and 37½ per cent on galvanized. The new list on oil country goods represents the same proportion of advance over the April 2 card as is shown by the full weight merchant card. Provision is made for the federal tax on bills of lading and for freight rate increases.

Lots of 1000, 1500 and 500 tons of malleable iron have been sold in this district at $33.50, furnace, the first two being for first half and the latter for prompt delivery. A Pacific coast interest has closed for 500 tons of plates at 5.90c, Pittsburgh, and is seeking another lot of the same size. This tonnage is for export and would be stored until the embargo is lifted. The Pennsylvania Lines West are asking for prices on small tonnages of iron and steel pipe, signal pipe, structural steel, spring steel and cold-rolled shafting for the first half of 1918.

Will Develop Manganese Deposits in Montana

The formation of the Western Ore & Mining Co. of Chicago, signifies the extensive development of manganese ore bodies located at Philipsburg, Mont. The company has purchased and leased over 13 of the richest claims in that district, and has a large force of men at work, developing and shipping ore. The Philipsburg district shipped more ore during the first half of 1917 than has been produced in the United States in any two years heretofore. The ore runs from 42 to 48 per cent of manganese and 6 to 12 per cent in silicon, with phosphorus well below 2 per cent. The ore contains about 1.5 to 2 per cent of iron. Shipments are being made daily. It is expected that by Dec. 1 the company will be shipping 300 to 400 tons per day. This grade of ore is selling for around $0.85 to $0.95 per unit per ton, f.o.b. Philipsburg. It is understood that one of the largest steel companies has contracted for 5000 tons per month of the company's output.

Consider Ship Strike

Following a conference with B. L. Worden, president of the Lackawanna Bridge Co., and of the Worden-Allen Co., who is superintending the carrying-out of steel fabricating contracts in connection with the 50 steel vessels to be built at Newark, N. J., by the Submarine Boat Corp., union officials representing 23 building trades are considering the advisability of calling a general strike on all government shipbuilding and cantonment work in the Newark district. Among plants affected would be those of the Federal Shipbuilding Corp., Foundation Shipbuilding Corp and the erection of government storage and magazine buildings at Lake Denmark, N. J. The unions object that while other Newark plants have been unionized, the government contracts which Mr. Worden has been superintending have involved either nonunion or open-shop work.

To Aid Distribution

Jay C. McLauchlan, of Pickands, Mather & Co., Cleveland, has taken up his headquarters at Washington to assist J. Leonard Replogle in arranging the distribution of iron and steel to the government, its allies and those plants making government supplies. Mr. McLauchlan will pay particular attention to the allotment of pig iron to the companies engaged in government work.

Furnaces Remain Banked

Youngstown, O., Nov. 7.—Coal is still scarce in this district, although relief is expected the latter part of the week. Three furnaces of the Carnegie Steel Co., one at Niles and two at the Ohio works and two furnaces of Youngstown Sheet & Tube Co.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Nov. 6.—Lead has supplied most of the activity and interest prevalent in the metal markets the past week. Continued absence of leading producers from the general market left trading in the hands of small producers, dealers and brokers, who flocked to this line in the dearth of business in other metals. The feature of the lead market was the advance made by the American Smelting & Refining Co. on Nov. 5 from 5.50c, New York base, to 6c. This movement marked the first turn in the long series of declines which had brought the price of lead down from between 11c and 12c three months ago. On Oct. 1 the American Smelting & Refining Co. was quoting 8c, New York, this price being approximately what had been paid by the government on its requirements in July, August and September. But producers agreed to supply the government's October requirements at the average price paid by the general consuming trade. The average as quoted in the *Engineering and Mining Journal* for October was agreed upon as the basis. As the government is the largest consumer at present, it had been thought the price would be maintained in order to keep up this average, but general demand proved so light in the face of heavy production, that independent sellers started price cutting, which was followed by reductions by the leading interest, until the level of 5.42½, St. Louis, was reached Oct. 25. The average price for the month, which the government will pay for the lead it bought in October, was 6.65c, St. Louis, which compares with 6.85c, the average price of the leading interest. The arrangements for the government's November requirements have not been announced. The outside lead market now is quoted about 6.25c to 6.37½c, St. Louis for prompt, November and December shipment.

The scarcity of all grades of tin continues acute, owing to the complex permit situation. The London tin and rubber exports committee recently ruled that no tin could be exported from any British possession except for a consumer. As no smaller than 25-ton lots are handled for export and many consumers buy one, five and 10-ton lots from dealers and jobbers, the difficulty of arranging for the needs of these small consumers is evident. Small lots of spot Straits are offered at about 68c. Spot Banca and Billiton at present appear unobtainable. Spot Chinese No. 1 and other 99 per cent brands of tin are quoted 64c, New York, and also are extremely scarce.

The spelter market shows little activity and has eased off fractionally the past week. Prompt and November shipment prime western brands are quoted about 7.50c to 7.62½c, St. Louis. December shipment is quoted about 7.62½c. Of interest is the report of the United States geological survey for the third quarter this year, showing production decreased from 180,569 tons average in each of the first two quarters of 1917, to 132,700 tons in the third quarter. The report stated that 28 per cent of all retorts had closed down.

The copper market has been devoid of developments the past week. The copper producers committee steadily is working off deliveries on old contracts, but consumers are not yet able to buy spot copper at 23.50c, the fixed price. Several sales for the first quarter of next year have been made, however, at this price.

The aluminum market still is sagging off, due to the embargo on exports to all but allied countries. No. 1 virgin ingot now is quoted 36c to 38c; No. 1 remelted, 35c to 36c; No. 12 alloy 27c to 28c.

Mechanics of the Chilled Car Wheel

Recent Experimental Work Reveals Many Valuable Qualities of Chilled Iron Castings —Its Capability of Withstanding Heavy Loads Without Flowing or Crushing Accounts Largely for Its Successful Use in Car Wheels

BY GEORGE W. LYNDON AND F. K. VIAL

SINCE its discovery in 1850, chilled iron has entered into many phases of industrial applications because of its ability to withstand enormous pressures without crushing or flowing. For this reason, as well as for many others, it is constantly being employed satisfactorily for many new purposes. Its major use, however, is in the production of car wheels. Thorough studies of the various characteristics of chilled iron have not been made until quite recently. The first well organized efforts that were made toward determining the characteristics of chilled iron resulted in 1909 from the efforts of the Association of Manufacturers of Chilled Iron Car Wheels. Through the efforts of the association, investigations of conditions of service have been made and recommendations issued for proposed improvements. Experiments have been made to disclose the added stresses imposed by increased carloads and, in particular, the heating stresses resulting from the application of brakes. Steps also have been taken by the association to establish standards and one of the greatest accomplishments of the society was to substitute three standard patterns of 30, 40 and 50-ton car wheels for the hundreds of special patterns formerly used by makers of chilled iron wheels.

The economic importance of this material can be realized when one considers that there are 25,000,000 chilled iron wheels in service, representing 8,000,000 tons of metal. Three million wheels or approximately 1,000,000 tons of chilled iron are required annually to replace those worn out in service.

Good Qualities of Chilled Iron

Among the characteristics which have combined to make the use of chilled iron car wheels satisfactory in the severe service imposed by heavy traffic conditions are the following:

Hardness of tread, which gives a maximum service with the least loss of metal.

The coefficient of friction between wheel and brake shoe is 25 per cent greater than that developed by steel under the same pressures. This is of great advantage in reducing the strain on the brake rigging and trucks, giving greater capacity to air cylinders and air pumps on the engines, etc.

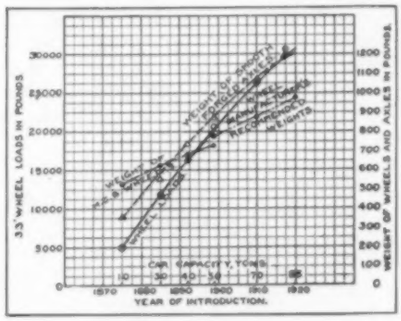


FIG. 1—INCREASES IN LOADS CARRIED ON EACH WHEEL AND ALSO THE INCREASE IN THE WEIGHTS OF STANDARD AXLES AND WHEELS SINCE 1875

The durability of brake shoes when used on chilled iron is 25 to 100 per cent greater than when used on steel, the variation depending upon the type of shoe used. The slow-wearing insert shoes commonly used on chilled iron wheels cannot be used on the steel wheel on account of their scoring action.

The abrasion between a chilled iron flange and a steel rail is much less than that of a steel flange against a steel rail. The chilled iron flange, therefore, reduces the loss in metal from the flange and also from the rail, which is an item of great economic importance.

That part of train resistance which is developed through flange friction and tread slippage is materially less in the case of chilled iron wheels than with steel wheels. This is one of the most important items of economy in connection with the chilled iron wheel.

A chilled iron tread, on account of the absence of ductility, retains its rotundity to a greater extent than is possible in treads made of steel. Large numbers of broken rails have, by thorough investigation, been found to have been caused by eccentric wheels. The ordinary flat spots of 2½ inches occurring in the chilled iron wheel do not produce anything like the impact blow that is developed in the case of an eccentric wheel. In case the flat spot is iron out, an elongated flat spot or an eccentric wheel is produced. This does not occur in the chilled iron wheels, and, therefore, a noise is developed such that the location of the defect is invariably discovered, which is not the case with the eccentric wheel.

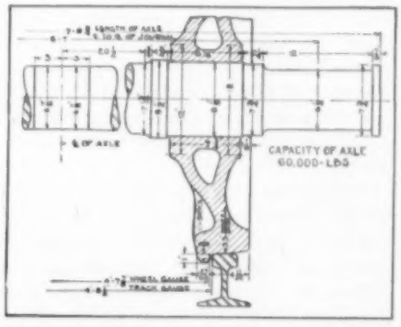


FIG. 2—SECTION OF A 33-INCH WHEEL MOUNTED ON A 6½ x 12-INCH AXLE

The scrap value of a chilled iron wheel is relatively greater than that of any other material, largely on account of the scattered locations of wheel foundries throughout the country. This is especially true in the west.

Chilled iron will carry heavier loads without distortion or cold rolling the surface metal than is possible with other metals.

No expensive lathes are required for machining treads, thereby saving a large investment in shop and machinery.

It is not the purpose of this paper to dwell upon the economic phase of the subject, for this is fully established, but rather to offer a few suggestions that will ultimately lead to a more intelligent design and classification of wheels for the service they are to perform. Since 1875, wheel loads have increased 500 per cent, axle weights 205 per cent, and wheel weights 75 per cent. The phenomenal growth in wheel loads is shown in Fig. 1.

Fig. 2 shows the 6½ x 12-inch axle and wheel used on the Pennsylvania and Union Pacific railroads.

Wheel Failures Decrease

Notwithstanding the rapid development in this field, statistical information shows that the number of wheel failures during the past 10 years are far less in percentage than during the decade prior to the introduction of the 100,000-pound capacity car. This favorable record has delayed a study of the relations of stresses originating in service and the factor of safety in different parts of the wheel. An analysis of wheel failures strongly indicates that the majority occur because of an entire disregard of rules of standardization and extremely unfair usage.

During the years 1914 and 1915 the Master Car Builders' wheel committee made a special effort to collect from

A paper presented May 25, 1917, before the Railway Club of Pittsburgh. George W. Lyndon, who presented the paper, is president of the Association of Manufacturers of Chilled Car Wheels.

Table I

Flange Pressures on Wheels

Size journal	Year axle recommended	Car capacity, pounds	Load on wheel, pounds	Flange pressure due to curvature, pounds	Possible maximum flange pressure, pounds
.....	....	20,000	5,000	3,750	7,500
3¼x 7	1873	40,000	8,250	6,200	12,400
4¼x 8	1889	60,000	12,000	9,000	18,000
5 x 9	1896	80,000	16,500	12,375	24,750
5½x10	1899	100,000	20,125	15,100	30,200
6 x11	1910	140,000	26,250	19,700	39,400
6½x12	....	170,000	31,000	23,250	46,500

all railroads and tabulate all failures of chilled iron wheels with particular reference to flange failures and cracked plates. Contrary to expectations, extremely few broken flanges were reported and the item of cracked plates was 30 per cent more prevalent in the 60,000-pound capacity cars than in the 100,000-pound capacity cars, and more than half of the cracked plate wheels in the 30-ton cars were confined to cars above 42,000 pounds light weight, which constitutes less than 5 per cent of the total equipment in that class. This indicates that the load carried is not a true criterion of stresses developed within the wheel. It is almost certain that wheel failures could be practically eliminated if the magnitude and intensity of the internal stresses, which are developed by various operating conditions, were fully established and the wheel designed and used accordingly.

Concerning Capacities of Wheels

Inasmuch as loads 50 per cent in excess of those required under 100,000 pounds capacity cars are now safely carried by chilled iron wheels, it is well to consider whether wheel loads of 30,000 pounds are nearing the limit of capacity of chilled iron, and if so, in just what way it will become manifest in different parts of the wheel.

The bearing power of iron or steel depends largely upon its hardness, and hardness is controlled by the carbon content. Pure iron containing no carbon is soft and ductile, and, therefore, has a very low bearing power. As the carbon content increases the metal becomes less ductile, and its ability to carry heavy loads without distortion increases. Rail steel contains about 0.70 per cent of carbon. The tread of the chilled iron wheel contains about 3.50 per cent carbon, and is, therefore, practically devoid of ductility and is capable of carrying the heaviest concentrated loads found in railroad or crane service without any indication of surface distortion. The strain in the surface metal is, therefore, very much less than in rail steel, as for example, where the movement of the metal commonly called flowing or cold rolling produces excessive surface strains sufficient to cause rupture of the entire section.

Chilled iron wheels are not appreciably flattened by any load below 250,000 pounds. As far as bearing power is concerned, chilled iron is ideal for wheel service and in addition, the metal takes on a high polish and produces a minimum amount of friction when rubbing against the rail, which is a quality of prime importance. The absence of ductility prevents distortion of the metal; therefore, the tread maintains its original shape as regards taper and the wheel as a whole retains its rotundity to a greater extent than is possible with any other material.

From all tests which have been made it is safe to assume that the average pressure per square inch over the contact area between wheel and rail is about 100,000 pounds. For extreme loads above 200,000 pounds on curved top rails, the pressure per square inch may reach 150,000 pounds. When the top of the rail is worn, the bearing area is increased, and the pressure per square inch correspondingly reduced.

The first permanent set, which indicates passing the elastic limits of the rail, occurs when the indentation or penetration is approximately 0.007 inch. If we assume that in regular service, the wheel load will be such that the indentation shall not exceed one-half this amount, we have the following results for maximum permissible wheel loads in railway service:

42-inch wheels..... Load limit 34,000 pounds
36-inch wheels..... Load limit 31,500 pounds
33-inch wheels..... Load limit 30,200 pounds
30-inch wheels..... Load limit 28,800 pounds

The above analysis and, in fact, general experience indicate that a 30,000-pound load for a 33-inch wheel is about the limit of rails of the present type. As far as wheels are concerned, double this load can be carried without the least sign of overload.

Loads Limited by Rails

The limiting loads will always be governed by the bearing power of the rail rather than any consideration on the part of the wheel itself. For this reason chilled iron is desirable not only for railroad service, but also for wheels under the heaviest concentrated loads such as occur under transfer tables, special cranes, unloading towers, swing bridges, etc., where the wheel load may exceed 100,000 pounds.

FIG. 3—A GROUP OF CRANE WHEELS FOR LOADS OF 125,000 POUNDS

FIG. 4—NORMAL DIRECTION OF FRACTURE IN NEW FLANGE

FIG. 5—CHARACTERISTIC FRACTURE THROUGH FLANGE

Combining the miscellaneous items of impacts, centrifugal force, etc., we may assume that the flange pressure at high speeds may be double the amount required for changing the direction of the truck on curves. Table I shows the flange pressure in four-wheel trucks figured on this assumption. This table also indicates the extreme rapidity with which wheel loads have grown during the period of development of modern railway equipment.

For a long period the 20,000-pound car was standard. This period also witnessed the establishment of flange contour and guard rail clearances. The maximum flange pressures were about 6000 or 7000 pounds. Since 1875, wheel loads and consequent flanges pressures have developed in very rapid ratio, until today wheel loads above 30,000 pounds on wheels 33 inches in diameter are contemplated which developed flange thrusts of 45,000 pounds. These pressures must be safely resisted by the flange, and inasmuch as chilled iron wheels are designed for this service, it is essential that the factor of safety in the flange be thoroughly investigated and the flange designed proportional to the work which it is required to perform.

Maximum Resistance vs. Flange Strength

The maximum resistance of axles against bending in terms of flange pressure and its equivalent journal load is shown in Table II. In general terms, the ultimate flange strength should be approximately twice the amount required to bend the axle. This information is given simply to show the approximate pressures that can be applied to the flange before the axle will bend.

On account of the widespread fallacy that the strength of flanges is not materially increased by thickening in a horizontal direction, it will be necessary to analyze in detail the laws governing flange strength. A long series of tests

Table II

Maximum Resistance of Axles

Axle		Flange pressure	Approximate equivalent journal	Maximum permissible journal
Size journal	Capacity	pounds	load pounds	load pounds
3¼x 7	15,000	24,000	58,000	7,500
4¼x 8	22,000	33,000	78,000	11,000
5 x 9	31,000	50,000	107,000	15,500
5½x10	38,000	70,000	140,000	19,000
6 x11	50,000	100,000	190,000	25,000
6½x12	60,000	125,000	230,000	30,000

have been made which establish the advantages of thickening the flange as compared with thickening the tread only. A summary of these results is shown in Table III.

Flange failures are of two kinds.

FIG. 7—FLANGE FRACTURE IN A STEEL WHEEL

First, where the fracture follows the grain of the chill through the throat of the wheel, extending entirely through the tread and finally through the flange section at both ends of the fracture, as shown in Fig. 4. In this case, if we compare the section with that of a structural shape known as an angle, the failure occurs in both legs. It is this class of failures which the Master Car Builders wheel committee dwell upon in their 1916 report, to the exclusion of all other failures. The second class of failures, which is fully as important as the first, is when the fracture occurs in the flange section alone, representing but one leg of the angle. This is shown in Figs. 5, 6 and 7.

Consideration of the method in which flanges fail is very important and must be thoroughly mastered before proper designing can be established. The greatest strength of flange is developed with a minimum of metal when the fracture occurs through both legs of the angle represented by the flange and tread. This immediately suggests that to obtain the greatest economy in metal, there must be a certain relation between flange thickness and tread thickness. Fig. 8 shows fractures from several different designs, having on one side of the wheel a thin tread with no brackets, while on the opposite side the tread is made of excessive thickness.

Fracture at 136,000 Pounds Pressure

The comparatively long fracture of the thin tread occurring at almost 100,000 pounds pressure, was caused by the flange breaking through the tread. On the opposite side, with a very thick tread, the fracture occurred through the flange only, at 136,000 pounds pressure, which was sufficient to bend the axle. It is self-evident that, where the amount of metal used is not taken into consideration, the maximum strength of flange is developed when the tread is so deep that the fracture occurs in a saucer shape in the back of the flange only. The depth at which the fracture extends through the back of the flange depends upon the flange thickness at the point to which the pressure is applied. Obviously, a thin flange having a fillet where it joins the tread will break at a very different angle than a new thick flange with an ample fillet.

The Association of Manufacturers of Chilled Car Wheels has made arrange-

FIG. 6—A CHARACTERISTIC FRACTURE OF THIN FLANGE

FIG. 8—A 100,000-POUND AXLE BENT BY FLANGE PRESSURE

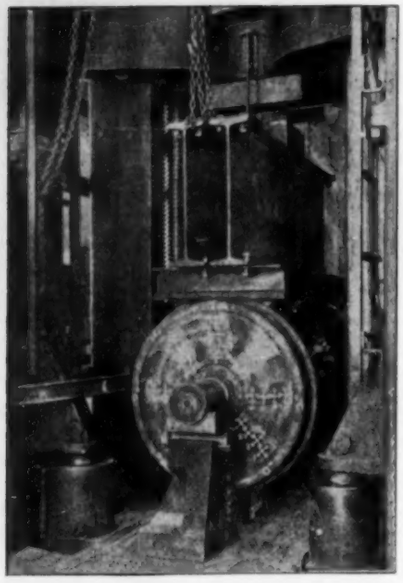


FIG. 9—VIEW OF 600,000-POUND TESTING MACHINE WITH A PAIR OF WHEELS IN POSITION TO RECEIVE VERTICAL LOAD

ments with the University of Illinois to determine, as far as possible, all the fundamental relations of stresses which are developed in service and the resultant strains in each part of the wheel. This is an undertaking of huge magnitude, requiring continuous testing over a period of two to three years. It must be remembered that there is no information regarding any of the properties of chilled iron, and each test must be checked and re-checked in order to avoid erroneous conclusions.

The program includes the critical examination of a wide variety of specimens to determine the specific gravity, average modulus of elasticity, coefficient of expansion and the relation of deformation for increasing increments of load. No reliable data of this nature is now available.

The test pieces for this part of the investigation consist of bars cut from various parts of the wheel, and also from test blocks cast for the purpose. Wheels of various weights and contours are tested to determine the stresses developed by pressing on the axle. This will include rough machining, moderately accurate machining and accurate machining, taper fits, etc. After the wheel are pressed on they are tested with a vertical load to a point where the surface of the rail crushes. This occurs at about 200,000 pounds. The strains are measured on the vertical and horizontal diameters and on the 45-degree lines at approximately 100 different points on the outside and inside of the wheel.

The strength of flanges of various sections, both new and worn, are to be investigated; also the stresses developed in the plate of the wheel by various flange pressures. The heat stresses within the wheel for various shoe pressures at various velocities is the most important part of the program and requires by far the greatest length of time for investigation.

This test carries with it investigation of the coefficient of friction of brake shoes for various velocities continuously applied, the work done under these varying conditions and the relation of shoe loss to work done under widely varying pressure and velocity. When this work is completed, much light will be thrown upon the relation of stresses to various service conditions, and the most economical design to meet the extremes of service will be established.

Table III

Strength of Chilled Iron Flanges

Thickness of flange	Thickness of tread	Flange strength pounds
1¼	1¾	90,000
1¾	1¾	140,000
2¼	1¾	200,000
2¾	1¾	275,000
1¼	2½	133,000
1¾	2½	200,000
2¼	2½	275,000
2¾	2½	400,000
1¼	3¼	175,000
1¾	3¼	250,000
2¼	3¼	350,000
2¾	3¼	500,000
1½	5	400,000
2	5	600,000
2½	5	800,000
3	5	1,000,000

Stresses Developed by Vertical Static Loads

Fig. 9 shows part of the 600,000-pound testing machine at the University of Illinois with a pair of wheels in place to receive the vertical load as nearly as possible corresponding to service conditions. The face of the wheel indicates points at which measurements are taken to record the deformation of the metal under various loads. Any load, however slight, causes a distortion in the metal which supports it, and the relation between stress and strain can be established in such a way that measuring the distortion determines the load, or vice versa, knowing the load, the distortion in the metal can be calculated.

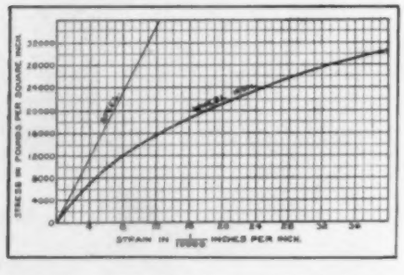


FIG. 10—RELATION BETWEEN TENSILE STRESS AND STRAIN FOR STEEL AND WHEEL IRON

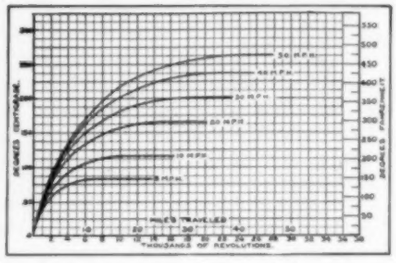


FIG. 11.—DIFFERENCE IN TEMPERATURE BETWEEN THE TREAD AND PLATE OF A 625-POUND WHEEL AT VARIOUS SPEEDS RESULTING FROM BRAKE SHOE PRESSURE OF 1500 POUNDS PER WHEEL

The strains are measured in ten thousandths part of an inch at intervals of two inches in both the radial and tangential directions. The relation between stress and strain for tensile stresses in steel and wheel iron is shown in Fig. 10, and by referring any observed deformation to this diagram, the stress per square inch is obtained.

Figs. 12 and 14 indicate the compressive and tensile strains in a 725-pound Master Car Builders' wheel under a vertical load of 200,000 pounds corresponding to 10 times the maximum wheel load under 50-ton capacity cars. It will be noted that the strain in the outside plate of the wheel is very much larger than on the reverse side. However, even in the outside plate, the stresses developed by this load are insignificant and practically negligible in considering the capacity of a wheel. To show how the strains from present maximum loads to loads radically beyond

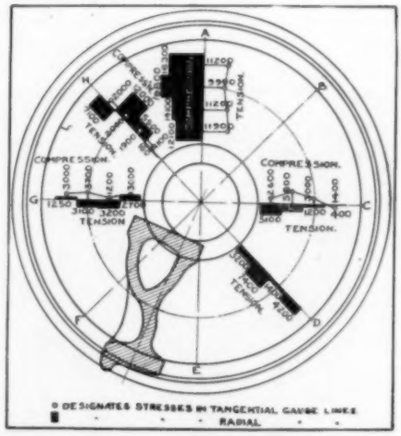


FIG. 12—STRESS DEVELOPED IN THE OUTSIDE PLATE OF A 725-POUND MASTER CAR BUILDERS' WHEEL UNDER A VERTICAL LOAD OF 200,000 POUNDS

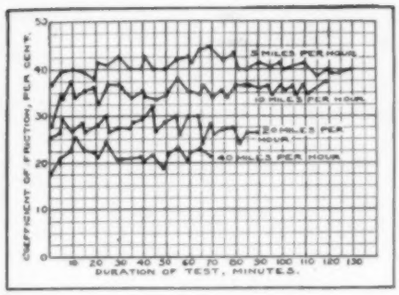

COEFFICIENT OF FRICTION, PER CENT.
DURATION OF TEST, MINUTES.
5 MILES PER HOUR
10 MILES PER HOUR
20 MILES PER HOUR
40 MILES PER HOUR

FIG. 13—THE COEFFICIENTS OF FRICTION AS RECORDED DURING TEST OF A BRAKE SHOE APPLIED TO A CHILLED IRON WHEEL UNDER 1500 POUNDS PRESSURE AT VARIOUS SPEEDS

the possibility of railroad service, tests were made of 21,000 pounds, 80,500 pounds, 150,000 pounds and 200,000 pounds. The maximum stresses under these loads are shown in Table IV.

The only item worthy of comment regarding the stresses under vertical load is that the largest stress for a 200,000-pound wheel load is below 20,000 pounds per square inch and that the stresses are not at all symmetrical through the metal. As far as wheel loads are concerned, they are of no direct importance, but indirectly the load determines flange pressure, development of heat, etc.

Temperature Stresses

The stress of the greatest magnitude within the car wheel is produced by the difference in temperature between tread and hub resulting from brake friction. This difference in temperature is a direct function of the brake-shoe pressure, the velocity of the wheel and length of time pressure is applied.

A study into these variable conditions is productive of much useful information regarding the limitation of wheels and methods of operating trains that will produce the maximum economy and safety. The first investigation has to do with the coefficient of friction of brake shoes at various shoe pressures and at various velocities.

The Master Car Builders' association has made voluminous tests during the past 20 years to establish the coefficient of friction of brake shoes for the purpose of determining data with reference to time required to stop a car from various velocities. No information is available concerning coefficient of friction, shoe loss and the effect upon wheels of continuous application at various shoe pressures and various uniform velocities.

To determine these factors, a series of tests are now being conducted at the University of Illinois which indicate that for continuous application of a pressure of 1500 pounds the coefficient of friction of one particular brake shoe on a chilled iron wheel closely approximates the percentage indicated in Fig. 13.

From this and other data developed at Purdue university, the approximate coefficients of friction for various velocities and pressure is shown in Table V.

Having determined upon the coefficient of friction for each velocity and each pressure, it is an easy matter to show the shoe pressure required to offset the gravity effect on any load on any grade. Theoretically, a shoe pressure of this kind would maintain a uniform velocity.

If brakes could be uniformly applied at a constant pressure, there would be no difficulty whatever in handling the heaviest capacity car on any grade found in ordinary railway service. Also the heat generated in the wheel would be so small that it would not require investigation. We know by experience, however, that certain wheels become excessively hot because of irregularities in shoe pressures throughout the train and for this reason it is essential to ascertain how much abuse each weight of wheel can withstand without encroaching too far on a reasonable factor of safety.

It is well known that the cause of practically every wheel broken in service is overheating; hence the extreme importance of ascertaining what is meant by overheating and how it can be avoided. The temperature developed in a 625-pound wheel has been well established for a 1500-pound shoe pressure, which produces a retardation equal to that required to handle a fully loaded 100,000-pound capacity car on a 3-per cent grade at 5 miles per hour, or the same car on a 2-per

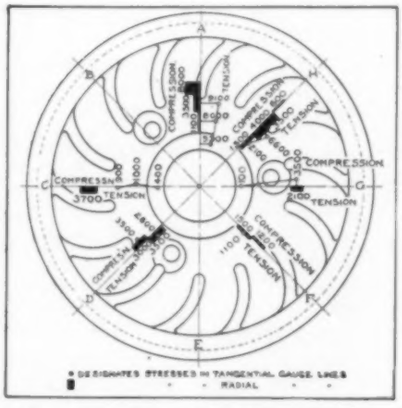


FIG. 14—STRESS DEVELOPED IN THE INSIDE PLATE OF A 725-POUND MASTER CAR BUILDERS' WHEEL UNDER A VERTICAL LOAD OF 200,000 POUNDS

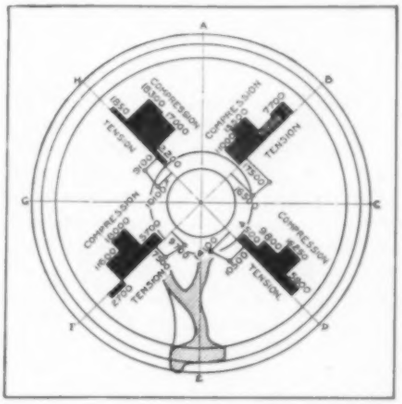


FIG. 15—LOCATION AND INTENSITY OF STRESSES DEVELOPED IN THE OUTSIDE PLATE OF A 725-POUND MASTER CAR BUILDERS' WHEEL FROM AXLE PRESSURE OF 123,000 POUNDS

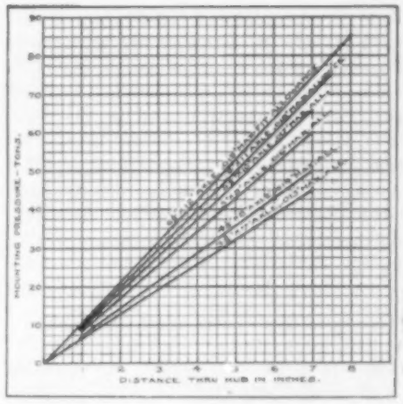


FIG. 16 — CHART SHOWING RISE IN MOUNTING PRESSURE AS THE WHEEL IS FORCED ON THE AXLE

FIG. 17—TYPICAL FORM OF SHELLED OUT SPOT

cent grade going 50 miles an hour.

The tests were made by observing the temperature at a point ½ inch below the tread and also center of the plate intersection and at the hub. The tread metal, of course, heats up more rapidly than the metal in the plate, because the conduction of heat through chilled iron is relatively slow. The differences in temperature between these two points at intervals of a few thousand revolutions are plotted, as shown in Fig. 11.

The difference in temperature for doing the same amount of work is very much greater in the higher than in the lower speeds. After a run of 20 miles at 5 miles per hour, a constant difference of 150 degrees of heat in temperature between tread and intersection was maintained because the amount of radiation became equal to the input, whereas at 50 miles per hour the difference in temperature was 420 degrees. A constant difference was reached after about 35 miles of travel.

In addition to determining the temperature difference, the deformation of the metal in the face and back of the wheel at various intervals was determined with a Berry strain gage, and by referring to these readings after making correction for expansion due to temperature changes, to the chart showing the relation of strain to stress, a law is established showing the relation of difference in temperature to stress per square inch.

Chilled iron has an advantage over steel with reference to temperature stresses from the fact that while the coefficient of expansion is the same in each case, the modulus of elasticity of chilled iron at the higher ranges is about one-third as much as that of steel. It follows, therefore, that the temperature stresses in the steel wheel for the same difference in temperature between the tread and plate must be materially greater than in chilled iron.

Preliminary work of this character was first attempted at Purdue university for the Association of Manufacturers of Chilled Car Wheels, in the year 1913. The work now being done at the University of Illinois is for the purpose of continuing the work started at Purdue, and it is intended to determine the various characteristics of each of the Master Car Builders' standard designs and also special designs to establish the factor of stress divided by temperature for each pattern. This is a very essential criterion to be used in connection with the standardization of wheels.

The indications at Purdue were that this factor varied widely according to the design, and it is intended to continue the test to a point that will definitely determine whether it will be desirable to radically modify the design of Master Car Builders' wheels in such a way that the stress in the plate of the wheel may be materially reduced for any temperature difference as compared with the present standard.

The results so far obtained represent but a fair start at the ultimate problem, for it will be necessary to prepare temperature difference curves and temperatures difference strain curves for each design of wheel before much light will be thrown upon the relative values of wheels of different weights of the same general design, and the possibility of designing in such a manner that there may be a high temperature difference for a small deformation in the plate of a wheel.

It is fortunate that the temperature stresses in tension along radial lines while the tensions from pressing on are compressive in the same direction and therefore are in opposite directions and tend to neutralize each other. It is also worthy of note that the stresses arising from pressing on, and from temperature differences, are very unsymmetrical with reference to the section of the wheel. This indicates that it is possible to place the metal in such a way that the stresses will pass through the section more centrally which removes the lever arm of the force and eliminates the bending moment, thereby reducing the tendency to bend or warp the wheel which will materially reduce the stress per square inch of section.

It is self-evident that the stresses originating from pressing a wheel on the axle are in compression along radial lines from the hub to the tread, and in tension along tangential lines. In other words, the metal is crowded together from hub to tread with a tendency to split or pull apart with the fracture along radial lines. That

Table V

Coefficients of Friction

SHOE PRESSURES—POUNDS

Speed, miles per hr.	500	1000	1500	2000	3000	4000	5000	6000	7000	8000	9000	10000
5	60	50	41	33	27	24	22	20	19	18	17	16
10	50	41	33	27	24	22	20	19	18	17	16	15
20	41	33	27	24	22	20	19	18	17	16	15	14
30	33	27	24	22	20	19	18	17	16	15	14	13
40	27	24	22	20	19	18	17	16	15	14	13	12
50	24	22	20	19	18	17	16	15	14	13	12	11
60	22	20	19	18	17	16	15	14	13	12	11	10
70	20	19	18	17	16	15	14	13	12	11	10	9
80	19	18	17	16	15	14	13	12	11	10	9	8

Table IV

Stresses Developed Along Radial and Tangential Lines

Outside plate radius	Load—21,000 Pounds Tension Tan.	Tension Rad.	Comp. Tan.	Comp. Rad.	Loads—80,500 Pounds Tension Tan.	Tension Rad.	Comp. Tan.	Comp. Rad.	Load—150,000 Pounds Tension Tan.	Tension Rad.	Comp. Tan.	Comp. Rad.	Load—200,000 Pounds Tension Tan.	Tension Rad.	Comp. Tan.	Comp. Rad.
A	2,700	.....	.....	2,400	5,000	.....	.....	11,600	8,700	.....	.....	16,200	11,900	.....	.....	19,800
B	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
C	1,000	2,500	1,300	.....	.....	3,700	2,200	.....	1,300	3,600	2,800	.....	400	5,100	5,800	.....
D	1,800	1,700	900	.....	700	.....	200	1,300	.....	2,700	1,500	.....	.....	7,400	.....	.....
E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
G	1,400	3,400	300	.....	.....	2,700	1,300	.....	1,600	3,500	3,600	1,000	.....	3,200	3,700	2,700
H	.....	3,100	1,700	800	.....	.....	1,500	7,900	.....	5,600	2,700	9,400	.....	7,100	2,000	12,000
Inside plate radius																
A	.....	1,400	1,300	900	1,200	1,800	900	1,500	6,100	.....	.....	2,000	9,100	.....	.....	8,000
B	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
C	1,700	.....	.....	500	2,900	.....	.....	2,700	3,200	3,000	.....	.....	900	3,700	1,000	.....
D	.....	.....	1,300	.....	.....	.....	3,300	.....	1,000	2,700	2,800	2,700	2,600	3,500	3,500	3,000
E	400	.....	2,900	1,100	6,100	2,000	4,200	900	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	1,700	.....	.....	1,500	1,100	1,400	.....	1,300	1,100	1,500	.....	1,200
G	.....	400	700	.....	.....	800	1,500	.....	.....	1,000	2,800	.....	.....	2,100	3,500	.....
H	1,400	.....	.....	1,100	.....	.....	.....	2,400	1,600	4,800	.....	.....	6,600	4,000	.....	6,000

the stresses are high is commonly known, because occasionally wheels burst in the press, but little or no attempt has been made to ascertain definitely just how great these stresses are.

If the machine work in connection with turning the axle and boring the wheel is uniform, the stresses in the wheel will be symmetrical and within the factor of safety, but irregularity in boring the wheels, such as occurs where the finished bore is produced with one cut, and the axle wheel seat is irregular, elliptical or tapered, the stresses in the wheel may become bunched and may destroy the wheel.

Tests Irregularity of Machine Work

The University of Illinois tests are expected to throw some light on the result of irregular work as well as to establish the best practice. The results obtained from a single pair of 725-pound wheels pressed on at 123,000 pounds are shown in Fig. 15.

The relation of mounting pressure to diameter of axles and distance thorough hub is shown in Fig. 16. Our experience with the larger axles is very recent, but we know that the limits given are safe in practice.

As far as design goes, the metal should be placed in such a manner that the stresses from pressing decrease uniformly from the hub toward the rim, eliminating certain large increments of stress in very short distances because of sudden variations in the section of metal through which the stress is being transmitted.

Conditions of these kinds occur in bringing a train to a stop, because the greatest frictional resistance between wheel and brake shoe occurs just before the wheel ceases to revolve, and often at this point frictional resistance exists between wheel and rail, in which case the wheel begins to slide. After the wheel once begins to slide, frictional resistance is very much lessened and sliding will be continued until the brake pressure is reduced. In sliding over a distance of only a few feet before the cars come to rest, the term "skidding" is applied, and a flat or skidded spot, the size of the area of contact between wheel and rail is produced.

A flat spot no larger than these contact areas is insufficient to cause the removal of the wheel, but the subsequent pressure and blows received in regular service very often result in the metal shelling out around the center of this contact area, forming a shelled spot, as shown in Fig. 17.

During the time the wheel is sliding all mechanical energy represented in the resistance to motion is transferred to heat through the agency of friction. Where the wheel slides for a greater distance, the melting point is reached and a segment of the metal is rapidly rubbed away, which quickly increases the area of contact, giving a much larger surface to receive the heat, thereby reducing the temperature. In this case the heat is sufficient to cause disintegration of the metal from a net work of fine thermal cracks which, as in the case of the shell out, disintegrates and drops from the surface of the tread of the wheel in subsequent service, leaving a rough jagged appearance.

This defect is commonly termed "comby from slid burned". If the sliding had continued over a much longer distance a typical flat spot would have resulted, which would call for the removal of the wheel as soon as it reached a repair track. It was formerly the custom to call these defects "sand holes" or "slag in the metal", indicating an initial defect in the wheel. This idea, however, is not consistent with observations in practice, where it is usual to find such defects in both wheels of a pair and in the same plane, indicating that the defect arose from slippage on the rail. The tendency of wheels to shell in pairs or in several pairs under the same car is well illustrated in an analysis of results obtained from 500 refrigerator cars, representing a total of 4000 wheels. Of this number 189 were removed for shelling out; out of the 189 wheels there were 174 shells in pairs and 15 shells singly. Under eight cars every wheel was shelled and under four cars four wheels were shelled.

This indicates not only that shelling is due to intense local heating while skidding on the rail, but also that this defect occurs under equipment having the highest braking power and making most frequent stops, such as engine tender, heavy passenger and interurban cars; and in freight service it is much more common in the cars of heavy tare weight, which, in some cases, have a braking power 10 per cent above the Master Car Builders' standard.

In a recent report of the National Association of RailwayCommissioners, in discussing the relation of heat generated by the brake shoe to the tread of the wheel, the following statement is made:

> So severe are thermal effects of this kind that no grade of steel will resist them, hence the appearance of thermal cracks is not to be taken as an indication that the steel has been lacking in good qualities. Under the influence of heat all metals succumb.

These thermal effects are largely produced by irregularities in present standards, irregularities in application of the standard, irregularities in brake pressures on long grades, irregularities in brake hangers and irregularities in piston travel.

Conclusions

In the foregoing survey of the mechanics of car wheels to ascertain the limiting feature in the wheel which will first succumb to an overload, the following conclusions have been established:

The bearing power is practically proportioned to the load, but the capacity of the wheel in this respect is so much greater than that of the rail that the limiting loads from a standpoint of bearing will always be determined by the rail.

Stresses originating in the wheel from the vertical load are small in comparison with other stresses and require only secondary consideration.

The possibility of repeated heating of the tread must be carefully considered: First, from the standpoint of the gross load and the grade over which the car may operate, and, second, from the standpoint of the braking power of the car as compared with the average braking power of cars of corresponding or heavier capacities. While stresses of the greatest intensity arise from continued brake heating, any desired factor of safety can be secured by simply proportioning the metal in the plate to correspond with the stress.

Stresses in the flange are proportional to the load. The section of the flange can be made of any strength required.

This item has not yet been determined, but evidently the stresses are not large in comparison with others and, therefore, of secondary importance.

The laws of pressure fits and the stresses in the metal in the hub surrounding the axle are now well established and it is only necessary that sufficient metal be used in the hub and plate to maintain the stresses within proper working limits.

Under certain conditions of unequal distribution of braking power, the surface of the tread may be heated to the melting point, resulting in a series of blemishes known as "shelled" and "comby", which may be of sufficient seriousness to cause the removal of the wheel.

It is thus seen that in no part of the wheel is there any indication of the impossibility of designing the wheel strictly in proportion to the stresses developed, with the possible exception of local heating of the tread.

If there is any one thing that has been absolutely demonstrated it is that the chilled iron wheel can be designed to meet any operating condition now existing or likely to exist on any railroad. It has been conclusively shown that the heaviest stresses that can occur under loads of 25,000 to 30,000 pounds per wheel can be taken care of with absolute reliability on the heaviest grades in service.

Electric Melting in the Foundry

A Discussion of the Present Status of the Electric Furnace and the Use of Various Types for Melting Gray Iron, Ferroalloys and Nonferrous Metals

BY DOUGLAS WALKER

SENTIMENT in the steel foundry industry toward the electric process has undergone a radical change. The period of skepticism and criticism, of experiment and doubt has largely passed, and the electric furnace is beginning to receive general acceptance. In the past, the steel founder has had to rely largely upon the claims of the various electric furnace salesmen. During the past year, the rapidly increasing knowledge of and data regarding electric furnaces have practically eliminated such a condition. Today the steel founder considering the purchase of electric furnace equipment, investigates the electrical and mechanical details of each furnace just as closely as he would investigate a molding machine an air compressor or any other piece of standard equipment.

Satisfaction Assured Purchaser

A year ago it would have been regarded as bad judgment for a steel founder to purchase an electric furnace that was entirely on paper with no units installed. Yet this is being done today, and the risk is minimized, because the steel founder knows that certain combinations are bound to give certain results, if carried out by engineers who are thoroughly conversant with electric furnaces. The electric furnace is today accepted as a standard type of melting equipment, and a steel founder who buys an electric furnace does not buy because of claims and with the fear of experiment; he buys on the strength of the known value of given combinations of features. When any equipment has reached this stage, it has definitely arrived.

Electric furnaces today are in commercial operation in foundries for the following purposes: Melting steel scrap, refining molten steel, melting and refining steel scrap, melting gray iron, melting malleable iron, melting ferromanganese and other ferroalloys, melting copper and copper alloys.

The common use of the electric furnace in the foundry is for melting down steel scrap for the production of steel castings. The superior qualities of steel castings thus produced, when properly made, have been demonstrated in too many ways for it to be necessary to go into detail here. In some foundries the electric furnace is used for the melting and refining of steel, where an extra high quality of steel is desired, low in phosphorus and sulphur, meeting definite specifications. The Canadian and United States governments are both installing a considerable number of electric furnaces for this purpose, the chief object being the production of steel low in sulphur.

The refining of molten steel taken from bessemer or open-hearth furnaces is not common to the foundry. This process is chiefly found in large steel plants and electric furnaces so employed are usually of larger sizes than are employed for melting down cold scrap.

There has been much talk of the adaptability of the electric furnace for melting malleable iron. It is the contention of many, and a very plausible one, that the silicon and carbon, the important elements in malleable iron, can be more closely controlled in the electric furnace than in the air furnace. Furthermore, it is manifestly possible to hold the heat in an electric furnace whereas in the air furnace the heat must be poured as soon as it is ready. It is also possible to keep the metal up to heat in the electric furnace, while shanking. Malleable iron has been melted in some few cases in electric furnaces, but there is practically no reliable information regarding the results available. It is the opinion of the writer that before long there will be considerable data available regarding the melting of malleable iron in the electric furnace, and that eventually the application of the electric furnace to this work will be as important as it is in the steel founding industry today. The ability to use lower-priced scrap materials for the production of malleable iron in the electric furnace will have an important bearing, as it has had in the melting of steel.

Electric Steel for Airplane Cylinders

The electric furnace cannot compete commercially with the cupola for melting gray iron. The use of the electric furnace for producing a specially high-grade gray iron, however, has not only been considered seriously, but carried out commercially. The Daimler Motor Car Co., Coventry, England, installed a small electric furnace for the production of a high-grade gray iron for use in aeroplane motor cylinders, and shortly after starting the first unit, placed orders for additional electric furnace units for the same purpose. It is believed that the use of the electric furnace makes a more suitable iron for such cylinders, due to the fact that the sulphur content is kept down, that the metal is melted under conditions ideal for the production of iron free from air holes, and that the iron produced in an electric furnace has the same density that is characteristic of electric steel. There is no doubt that in the electric furnace, by keeping down the sulphur, a higher grade iron can be produced continuously than is now produced in the cupola. The entire matter comes down to a question of commercial practicability; that is to say, whether the higher quality of product justifies the considerable initial investment required and the higher operating cost. In melting gray iron in the electric furnace, the ability to use scrap material will probably figure in reducing the difference between the cost of melting in the cupola and in the electric furnace.

Heats Ferromanganese for Ladles

The use of electric furnaces for melting ferromanganese is gaining ground, particularly in large steel plants operating a number of open-hearth furnaces. Ferromanganese can be melted in an electric furnace with comparatively small loss of manganese, provided proper slags are employed. One big steel plant installed a 1-ton holding capacity electric furnace for melting ferromanganese for additions to the open-hearth ladles. It was believed that by adding the manganese in a molten state instead of cold, the quantity of ferromanganese necessary for deoxidizing the steel would be reduced by approximately one-third. On such a basis, a furnace would pay for itself in less than a month's time under present market conditions. In this connection, it is of interest to note the results obtained in melting down manganese steel scrap in the electric fur-

A paper read at the September meeting of the American Foundrymen's association at Boston. The author, Douglas Walker, is associated with the Booth-Hall Co., Chicago.

nace. The manganese steel scrap employed contained from 12.25 to 12.50 per cent manganese. When molten, and before adding more ferromanganese, the metal contained 11.50 to 11.75 per cent manganese, showing a loss of manganese of less than 10 per cent.

The use of electric furnaces for melting of non-ferrous metals has not advanced sufficiently as yet to permit of definite statements. For melting brasses and bronzes, furnaces of the direct arc type, indirect arc type and the induction type are employed today. The induction type furnace is theoretically the ideal furnace for this kind of work from the standpoint of minimizing losses, but has the disadvantage that for practical operation it should be worked continuously 24 hours per day, and this does not fit in with the usual practice of brass foundries.

Acid or Basic?

One of the primary questions of the steel founder today, when considering the installation of electric furnace equipment is whether to operate acid or basic. This is a matter entirely dependent upon local scrap conditions and upon the character of product to be produced. The acid process is the simpler operation and requires less technical supervision. On the other hand, with the acid process, it is necessary to use a scrap sufficiently low in phosphorus and sulphur, and there is not the flexibility for producing castings of special analysis that is possible with the basic process. It is the writer's belief that under present market conditions, particularly, electric furnaces for the production of steel castings should be operated basic, irrespective of the comparatively high cost for basic refractories. This opinion is based on the fact that there is today so wide a margin between the cost of the higher grades of scrap for acid melting and the lower grades of scrap which can be melted and refined on a basic hearth. The present market on the miscellaneous grades of steel scrap that can be employed in the basic process is considerably under the market for grades of scrap such as must be employed in the acid electric process if satisfactory castings are to be produced.

In this connection, the writer heard a short time ago of an interesting process which was contemplated. It was described as a reverse-duplex, employing electric furnaces. The idea was to melt scrap and refine it on a basic lining and then transfer the molten metal to an acid-lined furnace for finishing, the assumption being that steel finished in an acid furnace is a quieter metal and more thoroughly deoxidized. Provided acid steel is superior to basic steel, the question is whether the additional cost entailed in transferring the metal and the additional power which would be consumed would be so great as to make the process impractical. As a matter of fact, there is nothing to choose between properly made steel whether acid or basic. Basic steel requires more technical and careful attention, but, given that, it is as satisfactory a steel as acid steel.

Another important change in the attitude of the steel founding industry toward the electric furnace today has to do with the claims for efficiency which are made by the various manufacturers. During the past two or three years, when the electric furnace was just coming into recognition, practically all builders went the limit on claims as to efficiency. Statements as to kilowatt-hour consumption figured as low as 450 kilowatt-hours per ton. It is only fair to say that the same was true in the early days of the converter, the open hearth and practically all melting equipment.

Today the steel founder recognizes that power consumption in an electric furnace is governed by a few elementary points of furnace design, including: The radiating surface of the furnace and the depth of refractory material, the number of doors and the method of closing doors, the number and size of electrodes, the speed of melting down.

The ideal electric furnace should have:

A combination of minimum practical radiating surface and maximum practical depth of refractory material.

A minimum number of doors commensurate with speedy and efficient working of the furnace and doors of a type that will work easily and close tightly so as to exclude air drafts and prevent loss of heat from the furnace.

A minimum number of electrodes entering the furnace and a minimum practical size of electrodes.

A maximum power input commensurate with practical operation of the furnace and consequently a maximum speed of melting down.

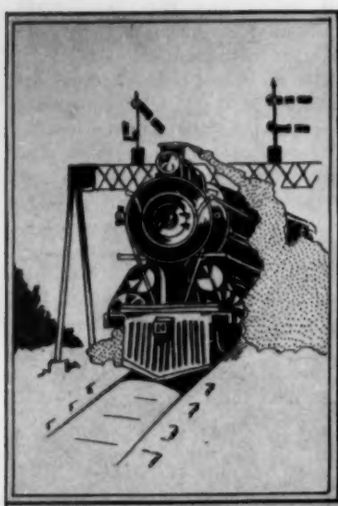
Providing a furnace meets with these fundamental requirements, the further efficiency of the unit depends upon the electrical and mechanical correctness with which the many minor details are carried out.

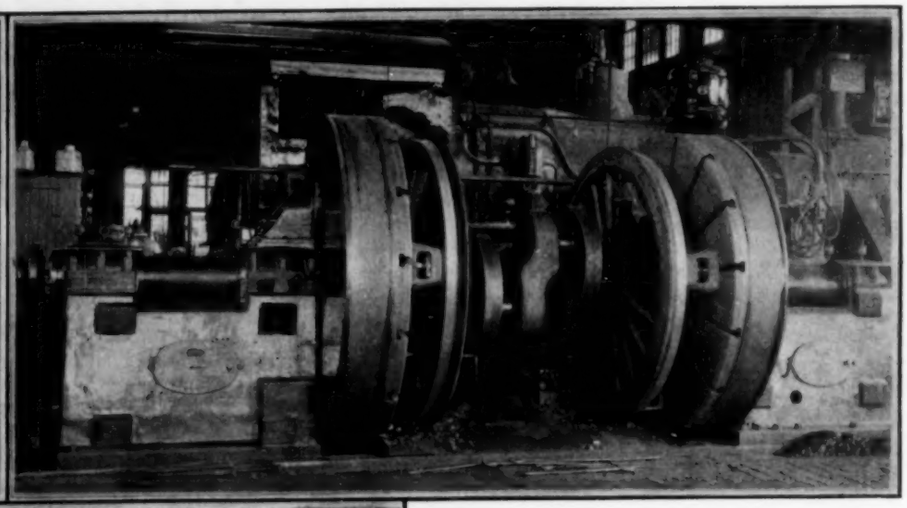
It is practically impossible to make any definite comparisons as to power consumption of various types of furnaces because there are so many variable factors to be considered. The care taken by the operator of the furnace in killing the metal, the character of the scrap to be melted, the question of whether more than one charging of a heat is necessary to achieve the full-rated holding capacity of the furnace, these and other points all have a bearing upon the kilowatt-hour consumption.

The type of furnace which the steel founder can install is today dependent largely upon the local power conditions. There can be no question that the single-phase type of electric furnace is the simplest and for straight melting down work somewhat more efficient. A considerable number of single-phase electric furnaces were installed in this country during the last few years, when power companies were anxious to secure any kind of electric furnace load. Today the situation has changed, and power companies are very cautious as to the type of electric furnace equipment which they permit on their lines. Cities where the power companies formerly welcomed single-phase electric furnace loads are today refusing to accept such loads. Cities like Cleveland, Toledo, Cincinnati, and practically all the big eastern cities have always refused to take on single-phase furnace loads. For this reason the steel founder is practically restricted to a choice between furnaces of the multi-phase type, or furnaces of the single-phase type operated by motor-generator set. The large additional investment which is necessary, and the larger power losses in the motor-generator set practically put the single-phase furnace so operated out of consideration. The steel founder has then for his choice furnaces of either the three or of the two-phase type. The two-phase furnace, by employing either single-phase transformers, Scott-connected, or single-phase transformers operating on an open delta, gives a balanced load over the three phases of a three-phase line.

Electric Furnaces Have Arrived

We can say at this time that the electric process has definitely arrived and is going forward much further still. The steel founder who installs an electric steel furnace today knows he is buying equipment which, like any other melting equipment, is susceptible to a certain amount of trouble and difficulties, but he also knows that he is buying an equipment which, given sufficient care and thought, will do definite things in a worthwhile way. The cost of operating an electric furnace is no longer a matter of doubt, and the better quality of metal, the important feature of the electric process, is generally recognized to be due to the following factors: The fact that steel can be made more uniform in chemical content and specifications can be met more closely because conditions in the electric furnace and process are ideal for controlling the carbon, silicon, manganese.

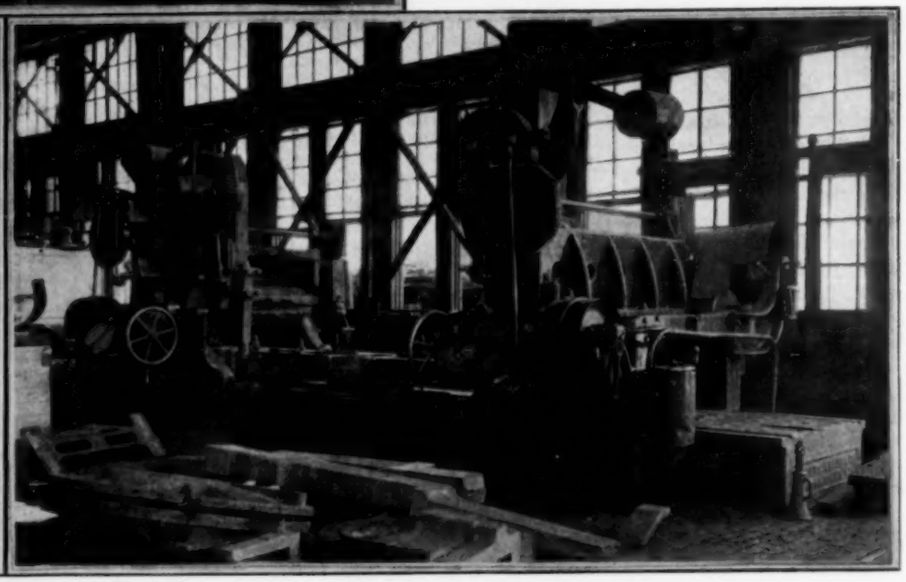


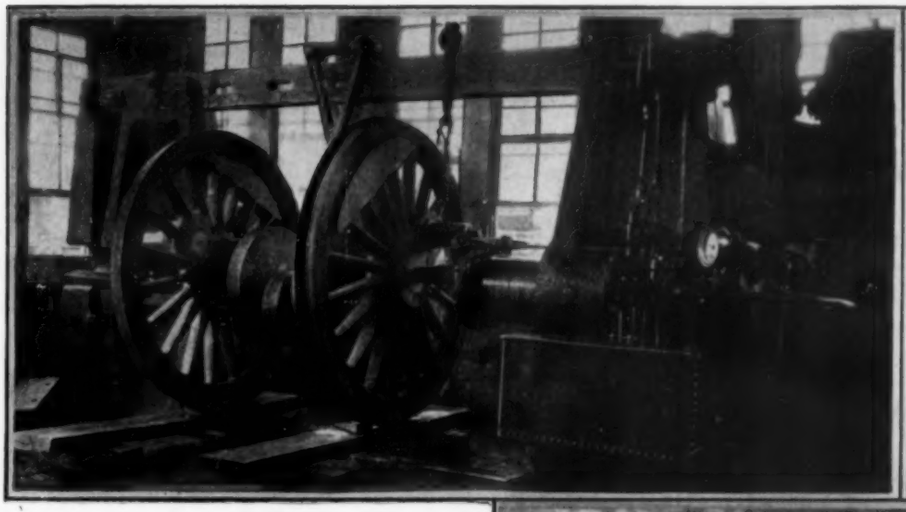


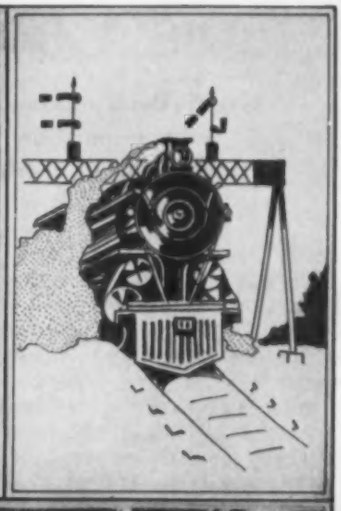
Special Equipment Used in

REPAIRING the worn parts of locomotives has been developed by years of experience to a basis of high efficiency. In the early years of railroading the great diversity of locomotive parts imposed many hardships on the locomotive repair shops. Every important repair center had to be equipped with a large variety of machine tools in order to meet the varied requirements of repair work. With the gradual standardization of locomotives came a similar standardization of machine tools, which gradually resulted in the development of single purpose machines. Now every large railroad shop is equipped with tools that easily and quickly perform certain standard operations.

The turning and boring of locomotive tires has been reduced to a simple machining operation. Mounted tires are turned in pairs in large motor-driven lathes similar to the one shown at the top of this page. Tires which have been removed from the wheel centers are turned or bored on large boring mills similar to the one illustrated. The two heads provide for two tools which may be used simultaneously. Forming tools are used to good advantage in finishing the treads of the tires. Hydraulic presses for removing wheels from axles, crankpins from wheel centers and for mounting wheels and crankpins are essential machines for every loco-







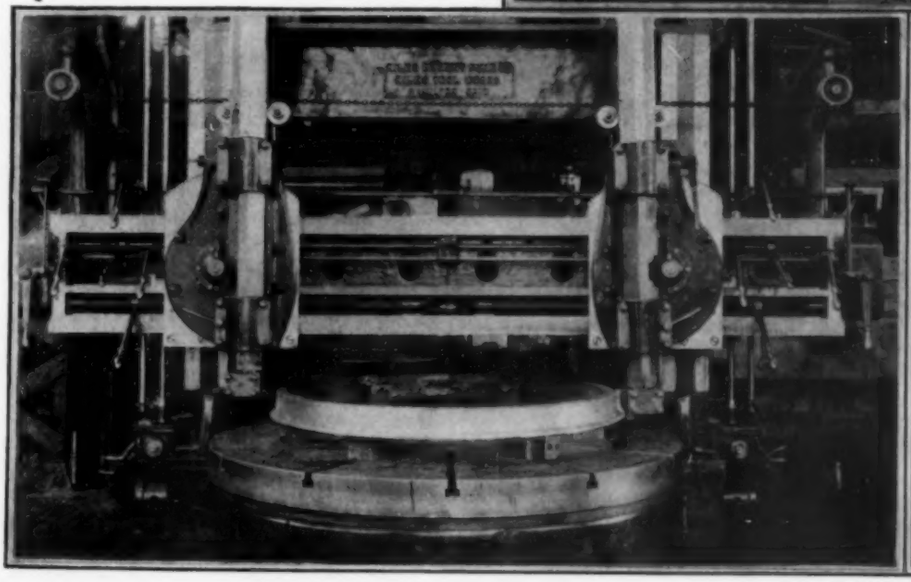
Locomotive Repair Shops

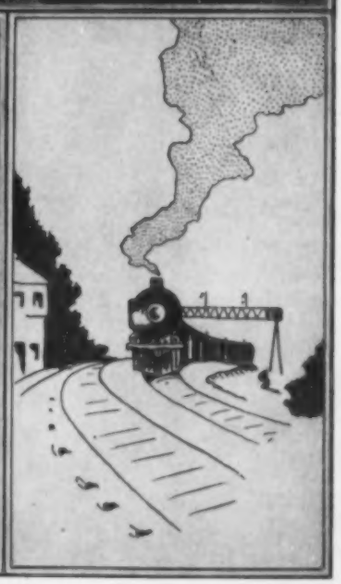
motive shop and round house. One of these heavy hydraulic presses is illustrated at the top of this page.

The machining of large cylinder castings presents a number of problems which have been partially solved by the introduction of special machinery. A planer designed with unusually large headway to permit the planing of cylinder castings is shown on the opposite page.

The drilling of the bolt holes in cylinders is facilitated by special drilling machines such as the one shown at the right. In machines of this type, the drill with its driving and feeding mechanism is mounted on a carriage which has an unusually large vertical movement.

Years ago the shaping of the jaws of rough forged engine frames was a tedious operation performed on ordinary planers and single-head slotters. Today the introduction of cast steel frames of large size has led the manufacturers of heavy planers and slotters to develop machines especially designed for the work. One of these, shown on the opposite page, is equipped with two heavy carriages, each provided with a slotting tool, and designed so that the jaws on either end of a frame may be formed simultaneously. The photographs reproduced herewith were taken in the Topeka shops of the Atchison, Topeka & Santa Fe railroad.





Urges Co-operative Research Work

Great Britain Has Need for Industrial Research Bureau to Combat After-War Competition — Considers Best Means of Encouraging Scientific Investigation in By-Product and Steel Industries

BY HERBERT W. ROWELL

GREAT BRITAIN is in dire need of co-operative research organizations if it is to fit itself for the keen commercial competition which will follow in the wake of the war owing to the fact that organizations of this kind almost have been unknown on the Isles. The war forcibly has brought home to us the fact that we are not so much individuals, as a nation in trade and manufacture; that the individual firms in many industries will have to formulate working agreements of various kinds if they are to successfully meet world competition. A large research organization can afford to buy better brains, has more success, and is less costly in proportion to its results than a small laboratory. We need, in this country, some system enabling the smaller firms to carry out industrial research under the best conditions at a minimum cost and with the best prospects of profitable results.

In reviewing the existing facilities, we find that a manufacturer without a laboratory of his own may consult a chemical engineer in private practice or a university professor. Those works having a routine testing laboratory usually make use of it for research work in addition, thus making the experiments extremely costly owing to their interference with plant output. There are comparatively few works in this country, even in the distinct chemical industries, employing separate research staffs, fewer still which thoroughly equip their staffs, and none which spend sums comparable with German or American firms of similar importance. The schemes to be put forward as outlined which might profitably be considered by groups of manufacturers, are: *First.* That a properly equipped laboratory and experimental station should be established on such a scale that it could afford to employ experienced industrial research men of high grade to organize and supervise the research work; *second,* that the manufacturer may safely entrust all the details of his processes to the organization without risk to business interests: *third,* that discoveries made should be the property of the manufacturers initiating and bearing the cost of the experiments; *fourth,* that the cost of experiments should be decidedly less than if the manufacturer had employed his own staff and laboratory.

It has been seriously suggested that the government should unite with the societies and the universities in the provision of research facilities for smaller works, and the idea has had enthusiastic support from the societies and universities; but although the manufacturer highly respects these institutions in their own sphere, he sees that red tape, delay, high cost and commercial inefficiency would make such a combination entirely useless.

This suggested a broad scheme on the lines of the technical combination of about 20 firms of incandescent electric lamp manufacturers in the United States, which spends a huge sum annually on co-operative research. A group of manufacturers, of for example, sulphuric acid, tar products or pig iron would pool investigation into raw material, methods of manufacture, improved products, disposal of by-products and outside competition, for their common good. A full-sized factory could be run in connection with the laboratory as in the case of the American lamp manufacturers to provide exact working data and efficiency methods and help pay the cost of research. The various American concerns have clearly demonstrated that a research is not complete until it has provided not only a new process or product but perfect details of working it on commercial lines.

At the other end of the scale we have something on the lines of the Mellon institute in Pittsburgh. This is a large institution in charge of an experienced director and a small permanent staff of specialists erected and endowed by subscription. The manufacturer lays his problem before the director, who will secure for him at an agreed salary, a university graduate with suitable qualifications to carry out the work. It is then agreed to carry on the work for a maximum time, and this chemist will have the sole use of one of the laboratories, the guidance of the experts on the staff, the use of the library and other general assistance for a definite sum. Sometimes the institute may agree to use the permanent staff only and take part payment through results. However, this plan involves the laying down of a fairly large problem of circumscribed dimensions which, coupled with other drawbacks, makes the value of the scheme doubtful to a small works.

Something less ambitious, organized in such a way that it can be developed into the full scheme as progress is demonstrated, seems to meet our present state. The tar trade may be taken as the first example, for it seems to be faced with both a commercial and technical revolution after the war. Coke ovens and large gas plants are partly refining their own products in competition with the tar distiller. Methods of distilling and fractionating are altering and require alteration, and the products of distillation will have to be marketed in a different state of purity. The values of tar products—never very stable—are likely to be altered considerably. The analytical tests accepted for sale purposes in the trade are sheer guess work and the chemists employed are not allowed to alter them. The manufacturer explains that the custom of the trade—that hoary British institution—cannot be altered, yet the ministry of munitions recently altered the tests for benzol and toluol.

The tar producers and distillers could subscribe, say in proportion to their capital, to institute a central laboratory and experimental works while control testing and efficiency of existing plant would remain a matter for the attention of the individual works. This laboratory could have two functions: One as an analytical department for devising specifications and standard methods of analyses; the other as a research department with an experimental works and staff of chemical engineers attached to it. The specifications and tests devised by the analytical department would be common property and would link producer and consumer and would help stabilize the trade, while the results of experiments, patented processes and plant, and other profits of the research department would be the property of the subscribers to the scheme. If it were established as a company with a scale of payments for the use of

A paper presented by Herbert W. Rowell at a recent meeting of the English Society of Chemical Industry.

ideas evolved, the commercial aspect of the laboratory easily could be solved.

The central analytical laboratory idea offers no difficulty, the cost would be small, and the results of distinct value, but unless the trade is closely allied by commercial agreements, then the question arises as to what work could be undertaken by a central research department. No single firm could provide the properly sustained research facilities or be expected to stand the cost of such work which is for the benefit of the trade as a whole; but as many manufacturers have only vague plans as to what use their increased manufacturing facilities can be put after the war, it would seem as though the establishment of a central laboratory would be a splendid expedient. The best brains will have to be promptly centralized into one virulent force run on sound commercial lines, for we must increase manufactures instead of selling our crude products to Germany and America.

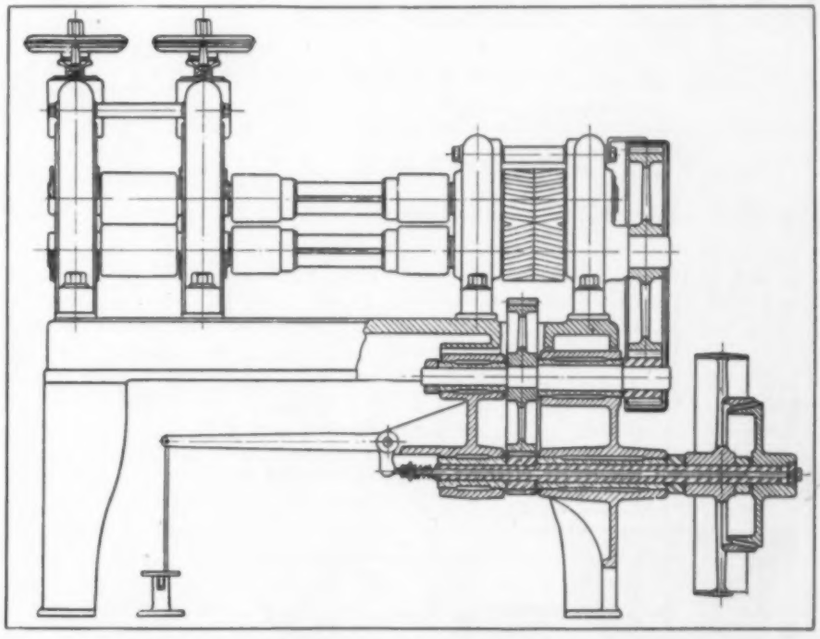
While the steel industry has received special and successful attention in this country during the last decade, the smelting and casting of iron still is done in the same way and in many cases by the same plant which was antiquated 20 years ago. The grading of pig iron still is determined by the fracture of the metal and by the district in which it was smelted. A large number of chemists are employed in iron works but, as a rule, their duties are of a routine nature. At any rate no research work of any note has been published in this country, and investigation work has not been encouraged in any way. Ideas for new types of plants have been imported from America in a few cases, while the Americans have developed dry blasts, fuel economy, rapid-working slag cement and the utilization of low grade ores, all of which may be ascribed to their research work. A combination of iron masters, foundrymen and mild-steel makers, quite apart from the remainder of the steel trade, profitably could institute a research organization to standardize pig iron and foundry grades and then develop improved smelting methods, more economical charges, heat treatments, foundry methods and iron and mild steel foundry mixings for standard purposes.

If such an organization could make blast furnace slag worth a shilling a ton or reduce production costs by a shilling per ton of pig, its existence would be very amply justified. The trade is faced with big increases in prices of ore, fuel and labor after the war, and when the demand for munitions ceases the only way to meet foreign competition at home and abroad is by utilizing expert advice in engineering, chemical and works efficiency.

As the last example, we might take the large number of works in the Birmingham district—mostly small concerns—which work alloys of copper, zinc, tin, nickel, lead and other nonferrous metals. Practically none of these works employs a chemist or metallurgist because of the comparative cost, yet they all feel the need of expert advice. Except for certain mysterious mixtures which are added to melting; or secret foundry methods; or guarded formulas for special alloys, which can easily be analyzed; there are no secrets in the trade and business interests would not be adversely affected by the institution of a co-operative laboratory. Quite a modest affair could be started for analytical work and general advice on technical problems but designed to expand into a full research department and experimental works where fuel consumption and furnace design, crucibles, heat treatment of castings, casting methods, micro-structure, rolling and stamping and finishing problems could be solved to meet the severe competition of scientific methods employed by our competitors. These three schemes are put forward as typical suggestions on which a meeting of manufacturers might take competent counsel from chemists and engineers experienced in their particular industry, and are open to considerable modification to meet stated cases, but in view of the serious outlook for our national trade no apology is offered in bringing them forward.

Roller Bearings on Cold Rolling Mill

One of the unique features of the cold rolling mills built by the Standard Machinery Co., Auburn, R. I., is the application of roller bearings to the journals of the rolls. This type of bearing eliminates largely the friction that exists in the plain bearing housing, thus allowing the mill to be operated at a greater speed with less heating. The reduction of friction makes necessary less driving power than ordinarily is needed. In designing these mills every effort has been made to secure correct alignment of the bearings. The ways of the housings are hand scraped and each housing is keyed to the bed, being properly aligned before they are bolted in position. The bearings in the gear housings, as well as the bearings in the driving and intermediate trains, are bronze lined.



COLD ROLLING MILL EMBODYING ROLLER BEARINGS

The gears used on these mills are of the herringbone type and are machined and cut after forging. Mills are customarily supplied with hardened and ground tool-steel rolls. Chilled iron and steel shell rolls, however, are supplied upon request. The liability of setting one end of the top roll lower than the other is reduced through the use of indexed hand wheels. The accompanying sectional view indicates a

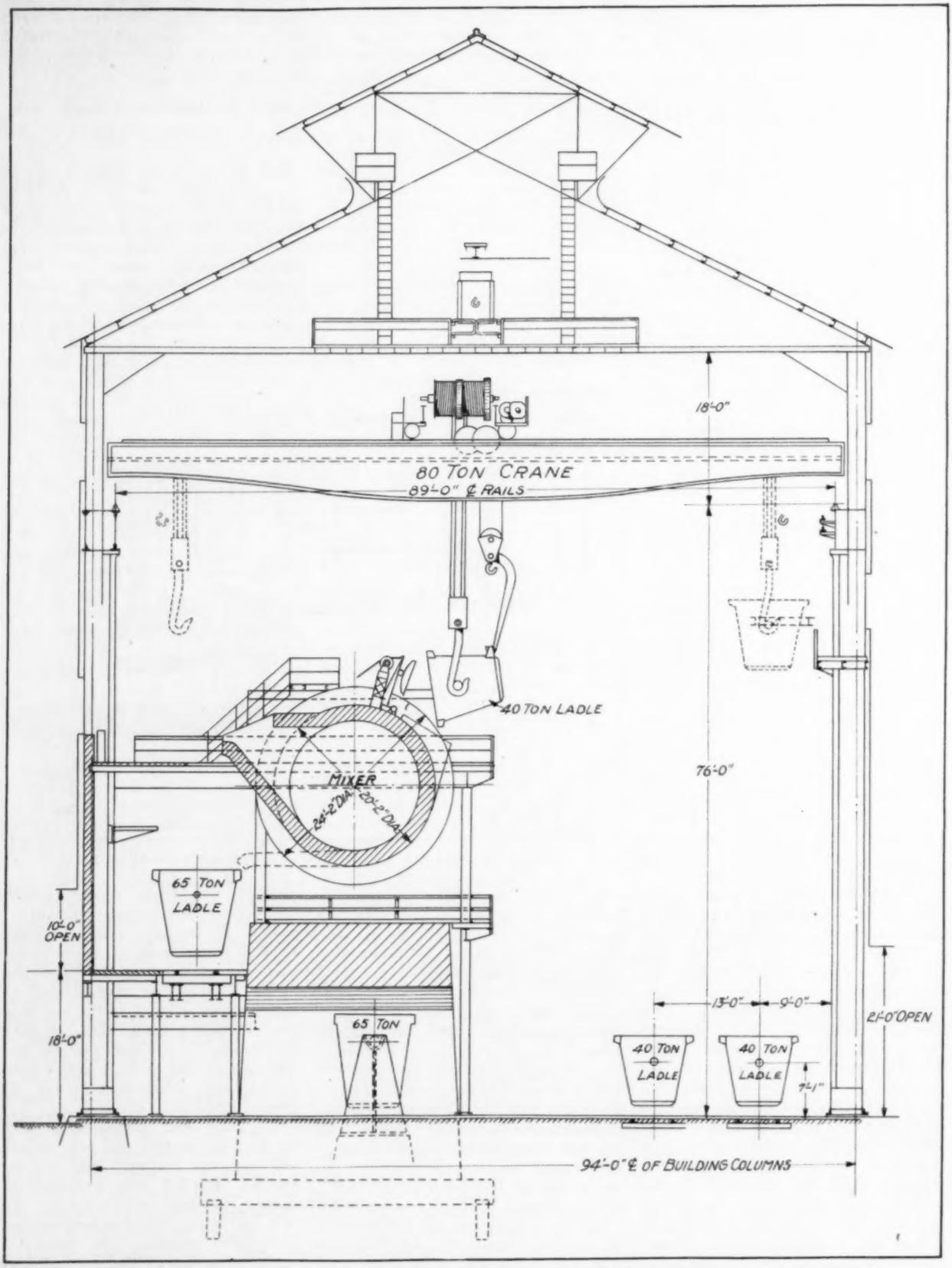


FIG. 1—GENERAL DETAILS OF 1300-TON MIXER INSTALLED BY YOUNGSTOWN SHEET & TUBE CO.

few of the details of construction. The mills made by the Standard company include several sizes of regular and a number of special mills.

Electric Steel in England

The abnormal demand for munitions has perhaps done more than anything else could have done toward breaking down any prejudice against electric steel. Before the war had been in progress many months our armament makers found themselves accumulating enormous quantities of borings, turnings, screwings, etc., of very high grade steels, containing chrome, nickel and other costly alloys. In ordinary times these turnings were of comparatively little value on account of the difficulty of remelting them without the loss of most of the alloys. But when the quantities of turnings produced in munition making became abnormal, it was at once realized that a solution of the problem of utilization was afforded by the electric furnace, because it was capable of saving all the nickel and almost all the chrome, while remelting the scrap, besides which it could, if necessary, oxidize the chrome while retaining the nickel.

Turnings, borings, etc., are being converted into steel for shells, rifle barrels, light armor plates and aircraft. Until the introduction of the electric furnace there was no type that could melt more than a somewhat limited proportion of turnings per heat. It was necessary to use a large percentage of new raw materials, such as pig iron, bar iron, etc., along with the scrap. Now, not only is it possible to have a whole heat of turnings, but to have "boils" of 10 and even 15 tons, by the electric process, whereas prior to the war few electric furnaces were of more than 2½-ton capacity. The introduction of this type of furnace is, perhaps, one of the most outstanding features of wartime developments in our local industry and is indicative of progress in steelmaking.

Electricity is already being generated cheaply, compared with the cost 10 or 20 years ago. When we consent to harness the tides or to utilize the water power latent in our rivers, or scientifically to convert our coal into energy at the mines, and so produce electricity at the lowest possible cost, electric iron smelting and steel melting and refining will probably enter upon a wide avenue of developments.—*Sheffield Telegraph*, Sheffield, Eng.

Installs Big Mixer at Youngstown

Details of 1300-Ton Mixer Recently Completed at Open-Hearth Plant of Youngstown Sheet & Tube Co.—Coke Oven Gas Used to Heat Vessel—Many Devices Are Provided for Workmen's Safety

THE Youngstown Sheet & Tube Co., Youngstown, O., recently installed one of the largest hot-metal mixers in the world in its open-hearth department. It was purchased because the excessive demand for steel makes it increasingly difficult for the bessemer mixer to supply enough iron for both the bessemer and open-hearth departments.

The new mixer, the details of which are shown in Fig. 1, has a capacity of 1300 tons. It received the first molten metal April 30, 1917. The cast steel shell, 24 feet 2 inches outside and 20 feet 2 inches inside diameter, was built by the Pennsylvania Engineering Works, New Castle, Pa. It is provided with a 24-inch silica brick lining.

The vessel, the top of which is 53 feet 7 inches from the ground, rests upon a solid concrete foundation, 25 x 40 feet. The mixer is tilted electrically, the molten metal being received by a 65-ton ladle. This ladle, supported by two double trunnions, rests on two standard railroad trucks. The ladle is placed on a platform scale directly under the spout of the mixer so that when the iron has been poured, no time is lost in weighing. An electric locomotive transfers the ladle of iron from the mixer to the open hearth.

A brick wall 30 feet high and 13½ inches thick forms the side of the building nearest the pouring side of the mixer. This wall contains several arched openings 10 feet high. In case any iron is spilled while being poured, it will flow to the ground through these openings. All steps and platforms in the immediate vicinity of the mixer are paved with brick.

The operator's platform is 44½ feet above the ground level. It contains a grate-bar opening, 5 x 5 feet, through which the operator may look and determine the amount of metal contained in the ladle. The devices for controlling the operation of the mixer are located on this platform. Pits for relining and drying ladles are placed at each end of the mixer. Coke oven gas is employed for drying newly-lined ladles as well as for keeping the metal warm in the mixer. The gas is shut-off while the mixer is pouring iron.

The building which houses the mixer is 106 x 80 x 94 feet. The structure contains two electric, double-drum cranes which travel on 150-pound rails, 76 feet above the ground. Each crane

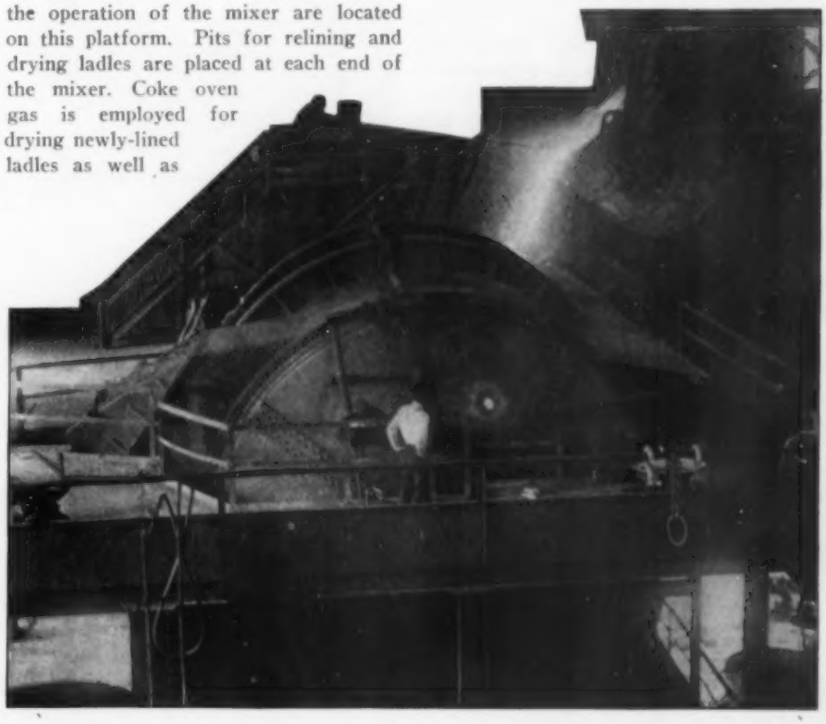


FIG. 2—1300-TON MIXER INSTALLED BY YOUNGSTOWN SHEET & TUBE CO.

has a capacity of 80 tons and a maximum lift of 75½ feet. Both cranes were furnished by the Morgan Construction Co., Worcester, Mass. A continuous platform, level with the crane tracks, extends around the building. Escape from or repairs to either crane are possible by means of this pathway. Steps lead from this platform to another runway which connects with a repair platform, 20 x 40 feet, 94 feet above the floor of the building. This repair platform also affords access to the cab of a 7½-ton auxiliary monorail crane. The track used by this crane is an 18-inch, 70-pound, I-beam. It is centrally located, 11 feet 10 inches above the platform, and extends from one end of the building to the other. The building was constructed by Riter-Conley Co., Pittsburgh, and incorporates the latest features in design.

New Cutting-Off Machine

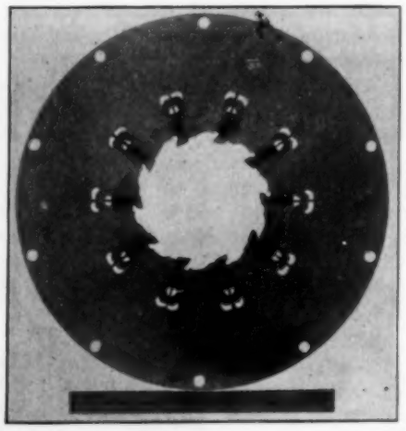
A NEW type of heavy duty internal tooth cutting-off machine which is diametrically opposed, insofar as principle is concerned, to the usual type of cutting-off saw, now is being built by the George Gorton Machine Co., Racine, Wis. Designed for heavy feeds and with a view toward reliability, the machine can be used for cutting either rounds or squares of any size that can be contained within a 4½-inch circle. It is said that cutting feeds of approximately 1 inch per minute can be maintained. A stock rack equipped with a patent measuring device greatly facilitates the work of the operator.

The blade, which is illustrated below, consists of a chrome-vanadium-manganese steel, annular ring or disk fitted with 10 cutters. These cutters are held in blocks which in turn are driven into the pockets in the bore of the blade. One edge of each block is tapered and fits a corresponding taper in the pocket. Both cutters and blocks are centrally located by means of tongues and grooves. The cutters are made of high-speed steel, are heat-treated and are alternately wide and narrow, so that the narrow cutter cuts out the metal in the middle of the cut, while the wide cutter cleans out the corners.

An adjustable automatic power feed mechanism of a new type obviates the necessity of reversing any clutches when ready to raise the cutter head to position after completing a cut. A handwheel is used to adjust the cutter head either up or down as it automatically disengages the feeding pawls. A spring under the cutterhead acts as a counterbalance taking the weight off the screw. A friction clutch is incorporated in the machine so that the machine can be driven from the lineshaft thus obviating the use of a countershaft and a belt-shifter. All belt-driven machines are arranged so that motor-drive readily may be applied at any time.

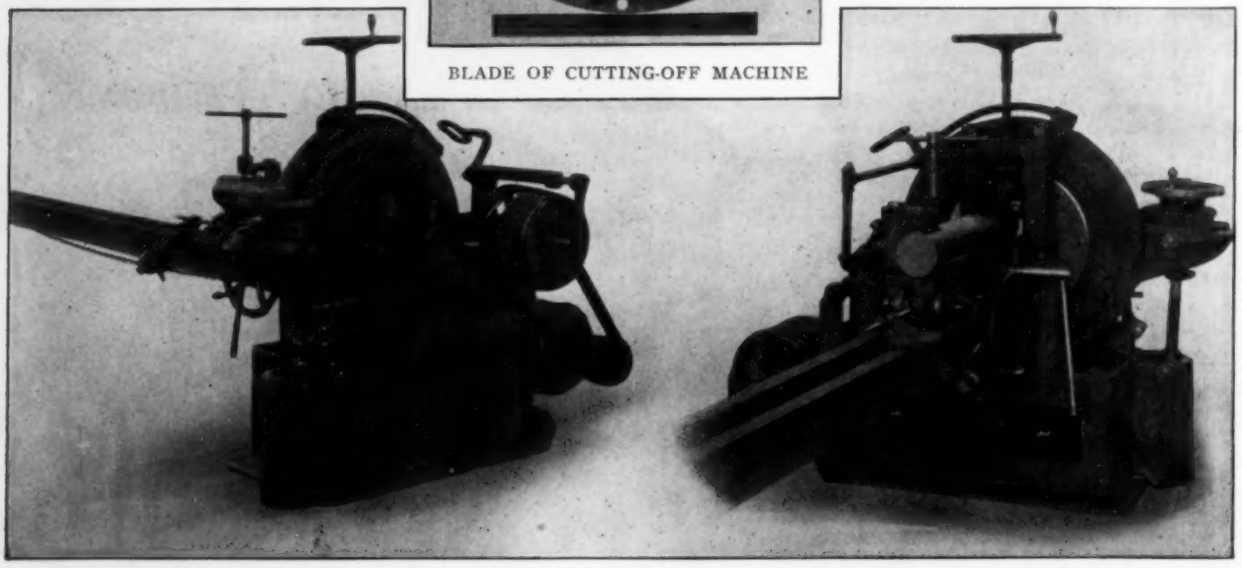
Main gear and pinion bearings as well as the drum bearings run in oil; which also lubricates the pinion shaft bearings. The working parts and ball bearings of the feed mechanism are submerged in oil, while all other bearings are lubricated by grease cups.

The stop rack, previously mentioned, is operated by means of a handwheel conveniently located, as shown in the accompanying illustration. A roller stand, supplementing the equipment, may be used in place of the stock rack. Overall dimensions of the machine, exclusive of the stock rack are: Front to rear, 5 feet 6 inches; parallel to stock rack 4 feet, and height 5 feet. The net weight is 1900 pounds.



BLADE OF CUTTING-OFF MACHINE

An interesting paper on the corrosion of fence wire was contributed to the proceedings of the thirty-second general meeting of the American Electrochemical Society in Pittsburgh recently by Oliver W. Storey, research engineer, C. F. Burgess Laboratories, Madison, Wis. The importance of the problem and the difficulty of obtaining reliable data are set forth in the paper. A large amount of new data obtained by the writer are given, with analyses of wires and detailed descriptions of their condition. Many of the statements of the Government Farmers' Bulletin No. 239 are quoted and their accuracy discussed.



SMALLER TYPE OF HEAVY DUTY CUTTING-OFF MACHINE BUILT BY THE GEORGE GORTON MACHINE CO., RACINE, WIS.

Benzol Sales

Reach Large Total—Toluol Supply Short—Solvent Naphtha Active

New York, Nov. 3.—Sales of benzol were larger than usual during the past week. Numerous spot sales, some involving well over 100,000 gallons, were made, and several contracts, one for an unusually large quantity for 1918, were closed. The market now is quoted at 44 to 49 cents per gallon both for spot and contract. Unusually large quantities probably could not be obtained lower than the inside figure. Numerous inquiries are pending.

As a result of earnest efforts, blocks of toluol were unearthed here and there during the week. These amounted to well over 100,000 gallons which were immediately allotted, by arrangement with the government, to companies having trinitrotoluol contracts. The greater portion of the toluol output of the country now is going into trinitrotoluol for the government. The available toluol is not sufficient to fill all requirements. Accordingly plans have been in formulation for the substitution of other coal tar products for making high explosives.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.44 to .49
Toluol	1.70 to 1.80
Solvent naphtha	.17 to .20

Per Pound at Producers Plant.

Phenol	$0.50

Per 100 Pounds at Seaboard

Sulphate of ammonia	$4.90 to 5.05

Contract

Per Gallon at Producers Plant

Pure benzol	$0.44 to .49
Toluol	1.50 to 1.80
Solvent naphtha	.17 to .20

Per Pound at Producers Plant

Phenol (nominal)	$0.50

Per 100 Pounds at Seaboard

Sulphate of ammonia	nominal

Phenol continues to enjoy a big inquiry but not much business was booked during the week. Producers have comparatively little phenol to offer for delivery prior to January. The last big sale was at 50 cents per pound; this was for December shipment.

Contract bookings of solvent naphtha during the past week involved larger quantities. The unsold stock continues large, however, and precludes advance in prices, which still may be quoted at 17 to 20 cents per gallon. English consumers seeking large quantities have been unable to buy because of the high ocean freights. These buyers now have raised their bids to 80 cents c.i.f. Liverpool per United States gallon, which compares with the previous high offer of 80 cents per imperial gallon. Inasmuch as no vessel space can be had at less than $80 per ton, none of this business was closed. Sulphate of ammonia continues featureless. Business is restricted to a few spot cars at $4.90 to $5.05 per 100 pounds at tidewater.

Blast Furnaces

Proposed by Ford Forbidden by Court —Must Divide Profits

Detroit, Nov. 5.—Erection of the proposed $11,000,000 blast furnace plant at River Rouge, by the Ford Motor Co., has been forbidden by the decision of the Wayne county circuit court, in the suit of John H. and Horace E. Dodge, minority stockholders. The latter have been seeking to restrain Henry Ford from applying the profits of the Ford Motor Co. beyond a certain amount, to the extension of the plant. The court contended that as there is plenty of pig iron to be had, that the building of blast furnaces with the motor company money is unnecessary.

According to the decision, the Ford Motor Co. must distribute to stockholders 50 per cent of the $60,000,000 profits of the fiscal year ending July 31, 1916, after deductions for all special dividends declared up to that date. While the court holds that the Ford company is not a monopoly as alleged by the Dodge interests, it is decreed that their demands for division of profits are justified. The decision will be appealed.

Will Roll Sheet Zinc

With an authorized capital of $1,000,000, the American Zinc Products Co. has been incorporated to roll sheet zinc at Greencastle, Pa. A 10-mill plant now is being constructed, and, according to present plans, will be completed within six months. Its monthly capacity will be 2400 tons. H. S. Buck will be general manager of the plant. He is at present managing head of the Fort Smith Spelter Co., Fort Smith, Ark., from which the American Zinc Products Co. will receive at least a substantial portion of its raw material. Among the incorporators are: D. W. Kerr, F. W. Stillwagon, W. Manning Kerr, R. A. Leitch and G. P. Gilmer.

Refractories Hit

By Shortage of Coal—Government Makes Some Purchases

Production of refractories is being seriously curtailed owing to a shortage of coal. This has compelled some plants to close down temporarily, and others to work far below normal. The shortage is partially due to priority shipments and to a lack of cars, which gradually is becoming worse. Manufacturers are making every possible effort to meet the requirements of the steel industry and are meeting with considerable success, although the fuel situation is causing grave concern. It is particularly disturbing because some of the consumers are engaged on war contracts.

Refractories

(Per 1000 f. o. b. works.)

FIRE CLAY BRICK.

(First Quality.)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK.

(Second Quality.)

Pennsylvania	$40.00 to 50.00
Ohio	37.00 to 40.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK.

(Per Net Ton.)

9 x 4½ x 2½	$135.00 to 160.00

CHROME BRICK.

(Per Net Ton.)

9 x 4½ x 2½	$125.00 to 135.00

BAUXITE BRICK.

(Per Net Ton.)

55 per cent.	$40.00 base
76 per cent.	100.00 base

The government recently has closed for a refractories tonnage, involving only a small lot, and paid the prices which are prevailing in the open market. These prices remain unchanged and have not been revised since last May, despite the tremendous increases that have been made in the prices of commodities of most every description. This is one reason for believing that the government will not fix levels refractories. It is evident that, in view of the heavy demands that have been made and are being made, for refractories that producers could have increased prices and had no difficulty in obtaining the figures they might have chosen to name. The trade felt, however, that it was preferable to permit the market to continue with normal prices and hence no changes have been made during the last half of the year.

Receive Advance

Workmen on Arsenal Additions to Get Double Pay for Overtime

The war department has given orders to the contractors engaged on the construction of additional buildings at the United States arsenal, Watertown, Mass., to pay their workmen double time for all overtime work. Union officials have notified the war department that the arsenal job will not be considered fair to labor unless the closed shop rules are established.

About 2000 employes of the Fore River plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., including machinists, machinists's helpers, cranemen, blacksmiths, etc., have gone on a strike because they claimed they were not receiving the same amount of wages as paid in other navy yards on the construction of government ships of war exclusively. The men want to be paid the schedule which was effective Nov. 1 in navy yards without any forcing of first or second class men into the third class. About half the men are on strike and the launching of a torpedo boat destroyer constructed in record time and of a submarine has been indefinitely postponed. A strike among the skilled workers also has broken out at the new Squantum plant, which was dedicated last week.

The plant of the McCaa Radio Co., Lancaster, Pa., has been offered for sale, since the government order prohibiting the establishment and operation of wireless plants practically has put an end to the manufacture of such apparatus for general

Ryerson Opens Detroit Warehouse

THE great strides made in recent years by Detroit in the consumption of iron and steel and the wide variety of the demand for mill products arising from the automobile industry have combined to make the city an industrial center peculiarly dependent upon jobbing facilities. Recognizing this, and to serve Detroit manufacturers more expeditiously, Joseph T. Ryerson & Son, Chicago, have opened a new warehouse at 470 Euclid avenue east.

From the standpoint of design the new warehouse, which is the company's fourth unit to be established in the country, is of especial interest. The site affords service from two railroads—the Grand Trunk and Michigan Central. The main building, of steel with concrete floors throughout and 350 feet in length, is laid out in five bays. Two are 50 feet wide and three, 75 feet. Offices are in a separate building, two stories, 40 x 75 feet, with a wing, 30 x 45 feet. The stock has been made up to meet the requirements, in particular, of the automobile and automobile parts, motor tractor and farm implement, stove and furnace, shipbuilding and metal specialty industries. A full range of angles, beams, channels, tees, soft steel bars, special analysis bars, sheets and their specialties, nuts, bolts and rivets, cold rolled stock and other lines are being carried.

Complete and modern machine equipment has been installed, and great attention paid to the crane equipment and details of handling.

The team-loading bay in span A is equipped with two traveling cranes of 2-ton capacity each. Span B is equipped with one 5-ton and spans C, D and E with one 10-ton crane each, arranged with two 5-ton hoists. The transverse travel is provided for by industrial tracks running through the plant, equipped with ball bearing trucks and operated with storage-battery motor-driven electric trucks. All tools in the plant are so placed relative to industrial tracks that material can be handled direct from unloading skids, by hand or crane, to cars placed on these tracks. The scale and weighing equipment is important, as a large portion of the material is sold by weight. The plant is equipped with the latest model of automatic-dial scales, having three stationary platform scales of 5-ton capacity each, one portable of 5-ton capacity, and a 5-ton mill-type scale.

INTERIOR OF WAREHOUSE SHOWING BAR STORAGE FACILITIES

The sheet shear located in span B is of the gate type, with a capacity of shearing 3/16-inch thick by 120 inches wide at one stroke. With this equipment it is possible to furnish for immediate shipment sheets of any size that may be required. The plate shear located in span C is the gate type and has a capacity of shearing 1¼ inches thick by 72 inches wide with one stroke. An important feature of this equipment is the power-driven roller table, which carries the plate to the shear. The material is handled through the shear on an arrangement of gooseneck rollers. This permits of handling plates from extremely wide to very narrow widths. The arrangement of the table is such that the material cut by the tool is carried away rapidly.

The friction saw located in span D is the Ryerson friction saw, type 3, direct motor-driven. The blade of the saw is mounted direct on the armature shaft of the special designed motor which is capable of 100 per cent overload. The forward and back movements of the saw carriage are controlled by electric motor and arranged with oil checks which prevent overloading. The saw has a capacity for cutting all structural sections up to and including 24-inch 100-pound beams. An idea of the tremendous speed required for this type of tool is gained when it is stated that the periphery speed of the saw is 25,000 feet per minute.

Builders Discuss Exports

Machine Tool Manufacturers Hear Foreign Trade Possibilities Outlined by Experts—Dealers Pledge Further Aid to Government

A SYMPOSIUM of the papers on export conditions presented at the concluding session of the annual convention of the National Machine Tool Builders' association at the Hotel Astor, New York, Oct. 30 to 31, shows that subordinated to the main idea of service to the nation there is some anxiety among the manufacturers as to the future of the machine tool industry, with its greatly inceased capacity and speeded-up production when the war demand shall have passed. The development of foreign fields as an outlet for the production of American machinery after the war is one outlet generally suggested. The concensus of opinion was that there will be a considerable demand in these markets, but that it will be necessary for American builders to make developments in these various fields.

France to Need Many Tools

Speaking for France, Roger P. Redier said that the war was bringing about an economic evolution to the French nation. He said that imports of machine tools from America in the past three years had amounted to $50,126,807, or 22 times as much as the average yearly pre-war import from Germany, England and the United States combined. France, he said, to make money, to re-establish her exchange, will have to increase her export in goods for which she has always had a world-wide reputation. She will have to create at home machinery for her special industry. She will have to rebuild and re-equip her destroyed factories and rebuild her rolling stock as well as her merchant marine. Mr. Redier said that methods of selling must surely change after the war, for there will be two classes of customers, those who have been engaged in war work and those whose plants have been destroyed or closed during the struggle. The latter class will be the heavier buyer at first, and this class in order to restart its business will require easy terms of payment. Referring to the machines bought by the United States government for use in France, Mr. Redier said he believed these machines would never come home again, but will be sold on the spot after the campaign, creating at that time a little disturbance in the market.

A discussion of sales opportunities for domestic builders in Belgium was given by E. G. Todd, a member of the firm of E. Isberque & Co., Antwerp, Belgium. Mr. Todd said that the Belgium government estimates that $400,000,000 worth of tools, machinery and raw materials has been taken out of Belgium by the Germans. American tools will always be looked upon with favor, he said. Referring to Belgium's ability to pay after the war, Mr. Todd said that all the Belgian gold reserve had been saved before the German onslaught, and that in addition, the Belgians had large investments all over the world, besides their wealthy Congo colony. Tools of all descriptions, Mr. Todd said, will be in great demand after the war. Heavy railroad tools, he said, especially will be in demand. There were no less than 19 railroad shops in Belgium before the war which were producing locomotives for all parts of the world, and most of the tools required for the production of these machines were supplied in Germany. He said that after the war the United States would find England its heaviest competitor in the machine tool market, Germany being eliminated and Sweden a negligible factor.

Speaking for Spain, Henry S. Moss, M. E., for the past 12 years a member of the American Machinery Syndicate of New York and Spain, emphasized the loyalty given by Spanish customers to the manufacturers with whom they deal and urged American sellers to nurse this feeling of confidence among Spanish buyers. He urged that American business men give over any impressions they may have as to the Spaniard being lazy and indolent.

Big Opportunities in South America

G. E. Briggs, of the Buenos Aires branch of the National City Bank of New York, discussed the coming struggle between American, British and German competitors in the Latin-American markets. Steady progress had been made, he said, until after only three years' experience, the United States has come to occupy the role of principal provider for these countries. Mr. Briggs said that the South American countries present differing aspects, some being further developed industrially than others. Mr. Briggs said that Brazil's industrial activities are varied, especially in the making of locomotives and rolling stock. A favorable market, he said exists in Chile. Recently a commission of young men was sent from Chile to study American railway methods and they probably will dictate the Chilean railroad policy in the future. The American Copper Mining interests, who have invested $150,000,000 in Chile, fill all their machine tool requirements in the United States from their head offices in this country. As a means of developing South American trade, Mr. Briggs suggested the co-operation of a number of noncompetitive firms in establishing a representative in South America to work through an importer in each market who would be appointed the exclusive agent for that territory. This representative, he proposed, would travel from one market to another, co-operating with the agents and seeing that the attention of the agent to this particular line is not allowed to die out.

New Officers Are Named

The convention held several sessions which were closed to the general public. At one of these sessions George Merryweather, recently placed in charge of the machine tool division of the war industries board, delivered an address. Retiring officers were re-elected as follows: President, J. B. Doan; first vice president, D. M. Wright, of the Henry & Wright Co., Hartford, Conn.; second vice president, August H. Tuechter, of the Cincinnati Bickford Tool Co., Cincinnati; treasurer, A. E. Newton, of the Reed-Prentice Co., Worcester, Mass.; secretary, Charles L. Taylor, the Taylor & Fenn Co., Hartford, Conn.; general manager, Charles E. Hildreth, of the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.

Members of the machinery section of the National Supply and Machinery Dealers' association at their meeting in the Hotel Astor, Oct. 31, considered ways and means for further co-operating with the government in assisting it to obtain tools for concerns needing them for government work. Captain T. W. Carlisle, formerly in charge of the machine tool division of the war industries board and now in charge of the small arms division of the ordnance department at Washington, urged machinery dealers to respond promptly with lists of their tools in stock, when asked by the government, as it was the practice of the government now to communicate with dealers whom it knows are to supply the requisite machines. The government is taking every possible step to conserve the supply of machine tools needed for this country's emergency work. Many tools destined for export have been seized, Captain Carlisle said, including fully $10,000,000 worth on order for Sweden.

Contract Abrogation is Condemned

Buyers and Sellers of Iron and Steel While Appreciative of Some Immediate Individual Advantages Generally Deprecate Any Attempt to Disturb Fundamental Business Relations—Views of Representative Men of Industry

STRONG opposition to the proposal of the federal trade commission that contracts be abrogated is shown by the concensus of opinion of both buyers and sellers of iron and steel. It is appreciated some immediate advantages would accrue to the buyers who have high priced contracts for iron and steel outstanding on mill books; furthermore in a lesser degree there would be some compensating benefits to the producers from the cancellation of high priced obligations for raw materials, supplies and equipment since the abrogation would be expected to run the full list of iron and steel plant contract expenditures; but the broader gaged view generally is entertained that to countenance so radical a step would be to fasten on the iron and steel industry and business in general a dangerous and subversive doctrine which would outlive the present war emergency. The importance of the contract as the foundation for stability and good faith in commercial operations is emphasized.

THE IRON TRADE REVIEW has collected the views of a number of representative producers and buyers of iron and steel on the subject of contract abrogation. These are here set forth:

Foundrymen Against Proposal

John Sergeant, president, Domhoff & Joyce Co., Cincinnati: "As far as our firm is concerned, a contract is a contract; we have always endeavored to live up to our promises, and with exceedingly few exceptions have found that our customers practiced the same thing. In fact, our salesmen have lately returned with reports indicating that the foundrymen feel the same way about this matter as we do. In registering this protest I wish to go on record as saying that we will do everything in our power to help out the government.

James Bowron, president of the Gulf States Steel Co., Birmingham, Ala.:

"The right of states to impair the obligation of contracts is expressly prohibited by the federal constitution, and many of these contracts are intrastate contracts, where the action of congress would clash with the state law, and any party violating such contracts would be exposed to state litigation and penalties unless clearly protected by superior and controlling federal legislation.

"Apart from the legal question, any such action would produce commercial chaos. Hundreds of thousands of contracts are made for the purchase of material, and under the disturbed and fluctuating market conditions of the past year at widely differing prices it is necessary in business to average costs and selling prices.

"Apart from these conditions, we respectfully submit that the sanctity of contract is fundamental to all business relations; no man and no company can, even with the protection of law, repudiate his or its contract obligations without forfeiting the confidence of the party from whom he had bought or to whom he had sold."

James I Stephenson, president, Cincinnati Iron & Steel Co., Cincinnati: "I cannot see how the matter would help our government just now. I fully understand that abnormal conditions exist; why make them more abnormal? This is a time for clear thinking and not a time to try out any theories. Contracts made by our company are not considered mere 'scraps of paper'."

G. H. Jones, vice president, Inland Steel Co., Chicago: "We are strongly opposed to contracts being abrogated. We are opposed to the suggested action and are surprised that the government should consider countenancing commercial immorality of this character. Such action would result in chaos in business affairs which would be intolerable."

James Foster, Republic Metalware Co., Buffalo: "There is a good deal to be said on both sides. Looking over our orders I see that it would be advantageous in some cases and disadvantageous in others. If the government decides that way, we shall cheerfully conform. The main idea is to win the war."

J. W. McQueen, vice president, Sloss-Sheffield Steel & Iron Co., Birmingham: "It would be a blow to the industry; for much of the iron that has been delivered since the government fixed a price and announced that the ruling was not retroactive has been at prices much under the $33 price, while that iron yet to be delivered will carry a higher price, so that the business will be evened up in the long run. The concensus of opinion, as I have heard it, is against the plan."

Pickands, Brown & Co., Chicago: "We cannot conceive of a more chaotic or demoralized condition of the trade than would result from such action, and plainly unfair to producers of iron, who up to the present time in good faith filled a large number of contracts at prices materially below the cost of production, growing out of unusual and unexpected advances in raw materials. Such action would permeate every industry in which iron and steel is a factor, and leave an endless trail of demoralization. The trade has for many years been conducted on the basis of strict fulfillment of contract obligations on the part of both buyers and sellers, and any changes in these conditions would create new situations far-reaching in their effect."

N. T. Jones, secretary of the Foster Belt & Nut Co., Cleveland:

"I could not imagine a more unwise step to take or a worse precedent to set than to abrogate contracts. Boiled down, a contract is nothing more than the word of honor of the men writing it that they will abide by its terms. The sequel of the government itself nullifying words of honor is obvious. If the government sets the example of calling all contracts null and void, why cannot the individual do it with even better grace whenever the situation is such that he would benefit financially? As a matter of fact, I believe there are far fewer contracts in existence today than are thought. For the last 60 to 90 days a contract for materials has been most difficult to write. Another point, many of the big contracts today are verbal and not written ones, inadvisable as this may seem.

B. H. Bole, general manager of the Hydraulic Pressed Steel Co., Cleveland:

"From a moral standpoint, of course, the abrogation of contracts cannot be justified. It would not be a healthy thing to establish, and would divert business into the old channels—cut-throat competition and wildcatting would return. But, under the present emergency, the abrogation of contracts all along the line, from raw materials through to finished product, might prove beneficial. Especially would this be true in the case of contracts that run for a considerable period into next year."

Would Destroy Business

J. A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O:

"If a law should be passed to abrogate contracts it will do more to disrupt business conditions than almost anything else possibly could do. Business can't be conducted on a day-to-day buying basis. Manufacturers must be able to protect themselves in all kinds of supplies. High-priced contracts are nearing expiration, anyway. There is no need for such action. It certainly would alarm business interests. We must have stability."

Robert Bentley, president, Ohio Iron & Steel Co., Youngstown, O:

"Abrogation of contracts would be a national calamity. Such action would undermine the whole business structure. Where would it stop if once started? The public welfare would not be served by such procedure. I can't feel that any one seriously considers such a proposal."

W. A. Wickwire, Wickwire Steel Co., Buffalo:

"I am dead against abrogation of contracts. I do not think the government, if it gives the matter sufficient consideration, will decide on abrogation. If it does, we might as well be in Germany, where they treat contracts as 'scraps of paper'."

S. B. McVay, Seneca Iron & Steel Co., Buffalo:

"It is a difficult question to comment on. It has its advantages and disadvantages."

Pig Iron Production at Same Level

Additions to List of Active Blast Furnaces Keep Output on Par With That of Recent Months as Average Production Per Furnace Has Dropped

THE blast furnaces of the country showed a slight gain in the production of pig iron during October over the record made in September. Irregular operation of furnaces, however, is holding the output well below the production during the fall of 1916 and the spring of this year. With 354 stacks active on the last day of the month, October showed a total production of 3,295,409 tons of coke and anthracite pig iron, compared with 3,140,742 tons during September, when 342 stacks were on the active list.

MONTHLY PRODUCTION.

	1917.	1916.	1915.
Jan.	3,159,839	3,171,878	1,591,024
Feb.	2,649,935	3,078,548	1,666,592
Mar.	3,255,813	3,327,630	2,046,280
Apr.	3,319,809	3,225,496	2,114,518
May	3,413,677	3,364,584	2,255,157
June	3,260,234	3,213,818	2,369,932
Total 1st half	19,059,307	19,381,954	12,043,503
July	3,337,442	3,221,127	2,563,311
Aug.	3,238,970	3,197,838	2,774,825
Sep.	3,140,742	3,208,041	2,834,342
Oct.	3,295,409	3,508,180	3,120,340
Total 10 mos.	32,071,870	32,517,140	23,336,321
Nov.	.....	3,317,805	3,035,235
Dec.	.....	3,184,178	3,201,605
Total 2d half	.....	19,637,169	17,529,658
Grand total	32,071,870	39,019,123	29,573,161

The heavy additions to the list of active stacks made during recent months has been the principal factor in holding pig iron production at the general level maintained since September, 1915. During that 25-month period, the average daily production of the country's blast furnaces has kept above the 100,000-ton level with but one exception. In October, 1915, however, 276 furnaces showed an average daily output of 100,656 tons. In October, 1916, 328 furnaces produced on an average 113,167 tons daily. In October, 1917, with 354 furnaces active, or 26 more than in October, 1916, the average daily output was only 106,304 tons.

The gain of 154,667 tons which October shows over September resulted largely from the additional working day, as the average daily output advanced only from 104,691 tons to 106,304 tons, a gain of 1613 tons. The steel works or nonmerchant furnaces produced 2,360,246 tons in October, and 2,249,201 tons in September, a gain last month of 111,045 tons. The production of merchant iron last month was 880,978 tons, against 847,817 tons in September, a gain of 33,161 tons. The average daily production of nonmerchant iron increased from 74,973 tons in September to 76,137 tons in October, or 1164 tons. The merchant furnaces produced daily during September, 28,261 tons, and during October, 28,419 tons, a gain last month of 158 tons.

The number of active stacks on the last day of October showed a gain of 12 over the number in blast on Sept. 30, the figures being 354 against 342. Nine merchant stacks were blown in and two were blown out, making a gain of seven, while eight steel works stacks were blown in and three were blown out, making the net gain five.

The production of ferro shows a gain of 4981 tons for October. Last month 30,756 tons of ferro were produced, compared with 25,775 tons in September. Spiegel production also shows a gain, the October production being 23,429 tons, or 5480 tons more than the September total of 17,949 tons.

The merchant blast furnaces blown in last month were: Shelby No. 1, Shelby Iron Co., Oct. 17; River No. 1 and No. 2, Corrigan, McKinney & Co., Oct. 7 and Oct. 24, respectively; Wellston No. 1, Wellston Iron Furnace Co., Oct. 6; Delaware River, Delaware River Steel Co., Oct. 17; Marshall, Juniata Furnace & Foundry Co., Oct. 19; Claire, E. W. Mudge & Co., Oct. 7; Napier, Napier Iron Works, Oct. 8; and Victoria, Southeastern Iron Corp., Oct. 8. The following merchant furnaces were blown out during October: Iroquois No. 1, Miami Metals Co., Oct. 16; and Saxton No. 1, Joseph E. Thropp.

The steel works or nonmerchant furnaces blown in were: Colorado E, Colorado Fuel & Iron Co., Oct. 18; South Works No. 10, Illinois Steel Co., Oct. 12; Maryland A, Bethlehem Steel Co.; one Ohio, one Edgar Thomson, one Duquesne and one Newcastle, Carnegie Steel Co.; and Atlantic, Republic Iron & Steel Co., Oct. 4. Those blown out were: Colorado E, Colorado Fuel & Iron Co., Oct. 17; Hannah, Republic Iron & Steel Co., Oct. 10; and one Farrell, Carnegie Steel Co.

The Graham blast furnace, which has been taken over by the Pocahontas Pig Iron Corp., Roanoke, Va., will be blown in this week. The Pocahontas corporation has an order for spiegel from the Italian government. Beginning Jan. 1, 1918, the stack will be changed over to ferromanganese, to fill a contract which the company has with a New York interest.

AVERAGE DAILY PRODUCTION.

	1917.	1916.	1915.	1914.	1913.
Jan.	101,930	102,319	51,323	60,624	89,929
Feb.	94,641	106,157	59,521	67,450	92,095
Mar.	105,026	107,343	66,009	75,534	89,123
Apr.	110,936	107,517	70,484	75,383	91,812
May	110,119	108,535	72,747	67,646	90,865
June	108,675	107,127	78,998	63,486	87,229
July	107,659	103,907	82,687	63,075	82,525
Aug.	104,483	103,156	89,510	64,403	81,839
Sept.	104,691	106,935	94,478	62,757	83,137
Oct.	106,304	113,167	100,656	57,007	81,933
Nov.	.....	110,593	101,174	50,042	74,322
Dec.	.....	102,715	103,278	48,236	63,746
Av'ge	105,500	106,610	81,022	62 934	83,980

OCTOBER PIG IRON.

States.	No. of stacks.	No. in blast last day of month. Oct.	Sept.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Oct.	Sept.
Pennsylvania	160	137	132	259,730	1,033,680	1,293,410	1,231,405
Ohio	79	72	69	176.183	568,813	744,996	729,161
Alabama	46	33	32	147,995	110,239	258,234	229,700
Virginia	21	14	13	48,372	.....	48,372	42,433
New York	27	22	21	81,224	121,384	202,608	180,720
New Jersey	6	5	5	25,436	.....	25,436	24,012
Illinois	24	21	21	40,392	236,102	276,494	267,036
Colorado	6	4	4				
Indiana	13	13	13	26.393	233,459	259,852	274,083
Maryland	4	4	4				
Wisconsin	6	4	4				
Kentucky	7	3	3				
West Virginia	4	4	4				
Tennessee	17	9	9	39,036	30,882	69,918	66,334
Washington	1	1	1				
Georgia	2	1	1				
Texas	3	0	0				
Minnesota	3	3	3	36,217	25,687	61,904	52,134
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						23,429	17,949
Ferro—All states....						30,756	25,775
Totals	433	354	342	880,978	2,360,246	3,295,409	3,140,742

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

O. B. NEWTON, who recently was appointed general sales agent of the Virginia Iron, Coal & Coke Co., with headquarters at Roanoke, Va., was born in Richmond, Dec. 28, 1877. He is a son of the late Bishop John B. Newton, of the diocese of Virginia. Mr. Newton was educated at the Virginia Polytechnic institute. He began his business career with the Virginia Carolina Chemical Co. He came with the Virginia Iron, Coal & Co. in 1904, as cashier at Bristol furnace, Bristol, Va. After serving in this position for two years, he was appointed assistant to the general superintendent of furnaces. He was superintendent of Dora furnace and Dora foundry and machine shop from 1907 to 1912, at which time he was appointed assistant to the vice president and general manager. In 1915 he was appointed purchasing agent, which position he held at the time of his appointment as general sales agent.

R. W. Gifford, head of the shell department of the Massey-Harris Co., Toronto, has been appointed superintendent of the Toronto plant.

Elmer J. McManus has returned to the United States after spending two years in Leicester, Eng., as the representative of the Graton & Knight Mfg. Co., Worcester, Mass.

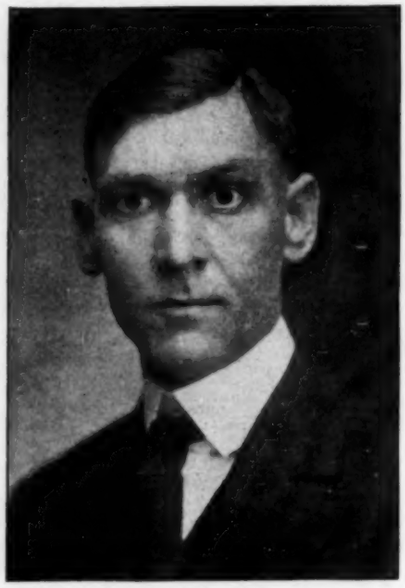
W. S. Quigley, president of the Quigley Furnace Specialties Co., Inc., New York, addressed the Brooklyn engineers' club on Nov. 1, on "The Use of High Temperature Furnace Cement in Furnace Construction."

John V. Culliney, for many years superintendent of the plants of the American Iron & Steel Mfg. Co., at Lebanon and Reading, Pa., has been appointed superintendent of the plant of the Lake Erie Iron Co., Cleveland.

Robert H. Murray, formerly general manager of the Chicago Bridge & Iron Works, has been made a major, in command of the first battalion of engineers of Illinois. He was first given a commission as captain.

H. S. Buck, manager of the Fort Smith Spelter Co., Fort Smith, Ark., will become general manager of the plant to be established soon at Greencastle, Ind., by the newly organized American Zinc Products Co.

Noah H. Swayne, 2nd, of Swayne & Co., Philadelphia, has been requested by the National Coal Jobbers' association, composed of 1400 soft coal jobbers, to represent the soft coal



O. B. NEWTON
Recently Appointed General Sales Agent of the Virginia Iron, Coal & Coke Co.

jobbers of the country at Washington in co-operating with the government.

Oscar F. Ostly has been appointed eastern representative of the Grip Nut Co., Chicago, and manager of sales for the Glazier Mfg. Co., Rochester, N. Y. He has opened offices at 2736 Grand Central terminal, New York City.

George D. Hastings, for the past 10 years New York manager of the W. & B. Douglas Co., Middletown, Conn., manufacturer of pumps, has been elected treasurer of the company to succeed Frank A. Coles, resigned. He will spend a part of his time in New York and a part in Middletown.

Alvan Macauley at the annual meeting of the Packard Motor Car Co., Detroit, was re-elected president and general manager, and Henry E. Bodman, counsel, was added to the directorate, succeeding Henry B. Joy, former chairman of the board, who has gone to France on government detail.

F. D. Egan, past president of the Association of Iron and Steel Electrical Engineers, and who for seven years has been steam and electrical engineer at the Midland plant of the Pittsburgh Crucible Steel Co., has accepted the position of works manager of the Pittsburgh Iron & Steel Foundries Co., Midland, Pa.

L. E. Dunham, who has been connected with the ore department of M. A. Hanna & Co., Cleveland, for many years, has been appointed director of purchases for the various interests with which the Hanna company is connected as agent. The present purchasing offices at Cleveland, Duluth and Wilkes Barre, Pa., will be maintained.

Eric H. Ewertz, Wollaston, Mass., who was a director of the Fore River Shipbuilding Corp., Quincy, Mass., which was recently absorbed by the Bethlehem Shipbuilding Corp., has been appointed general superintendent of the new Squantum, Mass., branch plant, now under construction. His assistant will be John Nolan, another Fore River man.

Dudley R. Kennedy severed his connections Nov. 1 as head of the industrial relations department of the Youngstown Sheet & Tube Co., Youngstown, O., to accept a similar position with the American International Shipbuilding Corp. The shipbuilding corporation plans the erection of yards on Hog Island, below Philadelphia.

Clement F. Street has opened offices as a consulting mechanical engineer at 50 Church street, New York City. He will give special attention to questions of design and tests of railroad equipment. Mr. Street has had a wide and varied experience in railroad mechanical problems. In 1916, he was awarded the John Scott legacy medal and premium for his development of a locomotive stoker.

Norman B. Hickox has been appointed sales and advertising manager of the National X-Ray Reflector Co., Chicago, to succeed E. H. Cameron. Hugh D. Butler, formerly manager

of Chicago sales, has been elected assistant sales manager. Guy R. Hastings will assume Mr. Butler's former position. George D. Bryson will be assistant advertising manager.

Henry Clay Frick is to present the city of Salem, Mass., with a bronze monument in memoriam of the late Joseph Hodges Choate, the famous jurist, that city being the latter's birthplace. The monument is to be 15 feet high, with a bronze figure, representing Miss Columbia or Patriotism, surmounting the column. On the base of the granite will be a medallion life-size portrait of Mr. Choate, suitably inscribed. Mr. Frick was an intimate friend of Mr. Choate.

Labors to Defeat Kaiser From the Air

WILLIAM A. MORGAN, the executive head of the Curtiss Aeroplane & Motor Corp., Buffalo, which is playing more than an ordinary part in the business of making the world safe for democracy, has been brought by the war into the very forefront of the ranks of this country's commercial geniuses.

He is the human dynamo of what is perhaps the greatest establishment for the making of aircraft in the world. Uncle Sam needs the infantry, the artillery, the cavalry and aeroplanes, but most of all he needs the aeroplanes. How great a part they are to play in the American war program is a secret locked in the breasts of the war department chiefs, but there is every reason to believe that the speculation that literally thousands of planes will be sent to spread American kultur in Prussia is no wild dream. On the Curtiss plants at Buffalo and elsewhere, is the general staff depending for its supply of planes, and on William A. Morgan once a Chicago newsboy, rests the responsibility for seeing that Uncle Sam gets these planes.

The Man Behind the Push

And Morgan is seeing to it that the planes are forthcoming. More than $5,000,000 is being spent on plant expansion to cover scores of acres. The country is being combed for mechanics who can work on engines and bodies. Within a few weeks, no less than 15,000 persons will be on the payroll of the company. A plant keyed up by three years of constructing airplanes for the entente allies is growing by leaps and bounds and grappling successfully with every fresh task the allied general staffs decree. Every effort is being made to rush production. Salaries have just been raised all around. The immense glass-enclosed factories built to obtain the maximum of light are a hive of industry by day and at night they are collectively miles of radiance. America is in no worthier manner rising to her task than here at this furnace of activity, and the man behind it all is Morgan.

Up until the United States entered the war, the business of making airplanes was away out of Morgan's line. He knew more about the rolling of copper and brass than he did about flying or flying-machines. Indeed, he knew so much about that other business that in three years he had taken over the Buffalo Copper & Brass Rolling mill, had increased the working force

WILLIAM A. MORGAN

from 300 to 5000, working day and night, had made the mill the biggest in the country, had made it pay profits instead of lose money, and had emerged a millionaire.

Born in Rochester, N. Y., in 1872, he grew up as a boy in Michigan and Illinois. His first job in 1885 was that of carrier for the old *Chicago Inter-Ocean*. Next he became a bookkeeper for a Chicago iron comany in 1892, and the next year for Swift & Co. His promotions came in good order and about 12 years ago the meat packing house looking for a live man to handle eastern business sent him to Buffalo to develop the trade for western New York, Michigan, Ohio, West Virginia, western Maryland and western Pennsylvania. He became one of the biggest men in the Swift organization. Their business grew by leaps and bounds and the man who was principally responsible, began to seek newer worlds to conquer. The Buffalo Copper & Brass Rolling Mill with six years of deferred dividends on preferred stock and $3,500,000 bonded indebtedness looked to him like a likely prospect for the exercising of a measure of business genius. He took hold of the institution and within three years had paid the dividends on the preferred, had paid $1000 per share dividends on the common stock, had paid off the company's bonded indebtedness and spent millions for plant expansion that brought more millions back to the company and its stockholders.

Morgan is a typical American business man of that curious admixture of idealism and practicability, both in large doses. He is a "no bunk" man and this feature is written all over his face—in the penetrating glance with a measure of romanticism in them, marking the visionary—the second-thought individual. Width of brow—brains; regular nose—shrewdness; long upper lip—genius. A snug-set mouth and a pugnacious chin spell determination in capital letters.

Responds to Country's Call

The call of country sounded for this business captain after he had made such a success of the brass and copper mill that he had decided to relinquish the active management of the concern.

"I had hoped to retire from active business but when the call came to help shorten this war through the building of aircraft, I knew that this patriotic duty could not be put aside by personal desire," he says in explanation.

His hobby, if he could be said to have one, before the war was philanthropy. He gave thousands away to various kinds of charities, finding time in the midst of all his business for the welfare of those persons and institutions in need of help. His personality is quite modest and he is essentially a home man.

The heating device department of the Pittsfield, Mass., works of the General Electric Co. is to be transferred to Chicago in the spring.

Center Control of Iron and Steel

J. L. Replogle Appointed Steel Director by War Industries Board and Invested With the Responsibility to it for Placing and Alloting Orders Among Producers —Will Be Medium Between Government and Industry

WASHINGTON, Nov. 6.—Responsibility to the war industries board for the distribution and execution of practically all orders for iron and stel for the United States and allied governments has been placed upon J. Leonard Replogle as director of steel supply. This will not interfere with the activities of the American Iron and Steel institute whose general committee on steel and steel products and sub-committee on distribution are engaged in the same work assigned to the new director. Instructions asking for weekly reports on iron and steel tonnages of the various mills will duplicate information already being furnished by them to the institute. It was the announced plan of the priorities committee of which Mr. Replogle continues to be a member, to keep its own record from priority orders issued by the committee.

As previously stated in THE IRON TRADE REVIEW, Mr. Replogle is the government's point of contact with the trade and James B. Bonner, vice chairman of the institute's distribution committee and in charge of the institute's offices here, is the trade's point of contact with the government. The channel between these two men represents the line of communication between the government and the industry. It results from the severing of relations of the council of national defense and its advisory committees through operation of the food control

Mr. Replogle's responsibility is on all orders, including those for steel billets and bars for ordnance, except finished ordnance or gun forgings. Government purchasing officers are to make application for priority certificates in triplicate, one to be sent the Iron and Steel institute, one to be retained by Director Replogle and the other to be returned to the respective purchasing officer, showing necessary data in regard to the order in question.

The resolution of the war industries board appointing Mr. Replogle is as follows:

"Under and subject to the raw materials division of the war industries board, J. Leonard Replogle is hereby appointed director of steel supply and shall have charge of the distribution and be responsible for the proper execution of all orders for iron and steel (including steel billets and bars for ordnance for gun forgings) for the United States and allied governments.

"He shall receive weekly reports from the iron and steel producers showing the tonnage of iron and steel of the various classifications on order for the United States and allied governments as well as domestic and foreign orders for general purposes. He will also keep informed as to the mill capacities and mill production and, in cases of retarded output, secure reasons therefor and in conjunction with the manufacturers and war industries board make every proper effort to remove obstacles which prevent maximum output of war necessities.

"Memorandum requisitions from the various departments of the United States government should be sent in triplicate to the director of steel supply, who shall, after proper consideration of all mill conditions as to getting maximum production and with particular reference to priority status of the order books of the various manufacturers, determine as to the allocation of the orders and all necessary details and retain one copy in the office of the American Iron and Steel institude and return one copy with information as to where the order should be placed and necessary details to the department from which the order emanated. The department concerned will then place the order direct with the manufacturer in accordance with its particular order system.

"Requisitions from the allied governments after approval by the allied purchasing commission, will be sent to the director of steel supply for proper distribution.

"The director of steel supply shall at all times work in close harmony with the various departments of the government, who shall give him as much preliminary information as possible in order that material can be placed to best advantage of all concerned and with due consideration with respect to giving the mills the best operating conditions to permit maximum output at minimum cost so far as the government necessities will permit.

"The director of steel supply will have all necessary steel statistical records to which the authorized representatives of the various government departments will have access."

No Price Reciprocity Yet From Allies

WASHINGTON, Nov. 6.—The United States government has not up to the present time obtained from the allies the reciprocity of lower prices promised American manufacturers in the war industries board's statement of Aug. 8, 1917. So far the only reduced prices procured are the ones on iron and steel products which the mills themselves agreed upon and which were announced in the President's statements of Sept. 24 and Oct. 11. The government has said nothing about acquiring lower quotations on raw materials entering into the manufacture of finished steel products.

Ferromanganese is the chief raw material on which the trade is anxiously awaiting reduced quotations but the government has given no sign of influencing the allies, chiefly Great Britain, to provide this relief. Inquiry at the office of B. M. Baruch, chief of the raw materials division of the war board, elicits no information on the subject. It was said by one government official that the price is gradually being lowered but he could throw no light on the government's action and admitted the reduction is due to conditions in the market.

It was argued by the board that "guns and ammunition employed against our enemy are for our benefit as much when used by our allies as when used by our own men." The statement then went on to say that "it is obviously unjust to require our allies when fighting our battle to pay our own people more than our government pays for the materials necessary to carry on the war." In putting this proposition to the American pro-

ducers the board said "we are confident that our manufacturers, who have so patriotically responded thus far to the calls of our government in this emergency, will readily accept this policy."

The manufacturers did accept the policy, not only agreeing to lower prices to the American government, which it could have forced only for its own war needs, but made the same concession to the allied governments and agreed to sell at these prices to American private consumers whatever steel they might need after urgent war orders were filled. And when the steel men made their prices they didn't ask lower quotations on anything. They probably expected the government to do as it promised.

That promise, in the exact words of the war industries board's statement, was as follows:

"But this policy (referring to the 'one-price-for-all' policy) has two important limitations. First: It is to be reciprocal. The allies must henceforth apply the same principle in dealing with their own producers and in selling to us and in selling to each other. Second: The arrangement must be limited to war materials, in order to protect our own industry."

Wickwire Plant Nears Completion

WITH the early completion of a nail mill, the Wickwire Steel Co., whose plant is on the Niagara river north of Buffalo, will have installed an entirely new steel plant consisting of four open-hearth furnaces, gas producers, blooming mill, rod mill, wire mill and nail mill. Work was begun on the new mills in May, 1916, and the first steel was made Jan. 8, 1917. The blooming mill started operation in July and the rod mill in August. The wire mill is just starting operation and the nail mill is about to start. The buildings were erected by the Lackawanna Bridge Co., Buffalo.

The four 60-ton open-hearth furnaces were designed and erected by Alex. Laughlin & Co., Pittsburgh, and are served by a low-type charging machine built by the Wellman-Seaver-Morgan Co., Cleveland, and a 50-ton crane built by the Alliance Machine Co., Alliance, O. Metal for the furnaces is supplied from a 400-ton mixer built by the Variety Iron & Steel Works Co., Cleveland. A 10-ton crane on the same runway with the pouring crane sets the molds, strips and put the ingots on a slide that delivers them under the crane in the heating furnace building. There are two continuous heating furnaces charged by an overhead 10-ton crane. These heating furnaces which were designed to use coke-oven or producer gas, now are operating with coke-oven gas. An hydraulic pusher delivers the heated ingots to the blooming mill tables.

Blooming Mill

The United Engineering & Foundry Co., Pittsburgh, built the blooming mill, which consists of three stands: two 32-inch 2-high sets and one 24-inch. These are driven by a 2200-volt, 1400-horsepower, alternating current motor built by the General Electric Co., Schenectady, N. Y. The stands are staggered and driven through the gear set so that there is no reversing. The billet to be rolled is directed to a movable table, passes through one set of rolls onto another table, and moves back and forth the same as in a 3-high mill, except in a horizontal plane instead of a vertical one. The bloom is cropped at the 4 x 4-inch size and then loops in a repeater through the 24-inch stand and is finished to 1¼-inch size with the second loop.

The 1¼-inch bar is run out to a shear and cut to 30-foot lengths on a hot bed. A 6-stand, 18-inch, continuous mill is now being constructed by the Morgan Construction Co., Worcester, Mass., to roll 1¼-inch bars for the rod mill, merchant billets or bars to 1½ inches, and sheet bars from 4 x 4-inch billets from the blooming mill. When the 18-inch mill is completed the looping feature of the blooming mill can be discontinued.

Rod Mill Has New Feature

A continuous double-strand rod mill, built by the Morgan Construction Co., Worcester, Mass., is driven by two alternating current variable speed motors of 1300 and 2400 horsepower rating, built by the General Electric Co., Schenectady, N. Y.

This rod mill has several new features for the production of a superior rod. It delivers the product to an enclosed conveyor so arranged that the bundles are not exposed to the air, thus eliminating excessive scale and producing a soft rod.

A wire mill with 300 wire drawing blocks and the necessary equipment for finishing various kinds of merchant wire is being placed in operation. The nail mill is nearing completion. It has 70 nail machines, 24 barbed wire machines and 50 tack machines. A new machine shop, wood-working shop, brick sheds and galvanizing and tinning mills have been erected.

Eight automatic gas producers supply gas to the open hearths. A traveling bucket crane conveys the coal from a bin under the cars, fills a bin above the crusher and also carries the crushed coal to the producer bins. The producers were built by the Morgan Construction Co., Worcester, Mass.

Organizes to Manufacture Pressed Products

The fabricating departments of the Sharon Steel Hoop Co., Sharon, Pa., and its subsidiary, the Youngstown Iron & Steel Co., Youngstown, O., have been purchased by the newly organized Youngstown Pressed Steel Co., of Youngstown. This latter company recently was incorporated with $1,000,000 capital stock. A site will be acquired and a plant erected as speedily as possible. In the meantime, the departments, which consist of the pressed steel metal and expanded lath and fireproofing units at the Youngstown Iron & Steel Co.'s plant and corner bead and channel units at the Sharon plant, will be operated in their present quarters. The new company intends to enlarge its operations, particularly in the fireproofing department. W. W. Galbreath, for many years with the General Fireproofing Co., Youngstown, O., heads the new corporation. He will have associated with him G. F. Danielson, who has been connected with the Youngstown Iron & Steel Co. The personnel of the Youngstown Pressed Steel Co.'s board has not as yet been announced.

Build New Forge Plant

The Milwaukee Forge & Machine Co., Milwaukee, has broken ground for a new plant which will cost $100,000, on a four-acre site acquired recently from the George H. Smith Steel Casting Co. The main forge shop will be 75 x 140 feet, 50 feet high, and the machine shop will be 65 x 100 feet, one-story, with sawtooth roof. The new plant is to be ready about Jan. 15 or Feb. 1. The present

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Invested Capital is Hopeless Puzzle

DO YOU know what your invested capital is? Probably you do not. Thousands of business men are trying to solve the puzzle presented in section 207 of the new war revenue act, which defines invested capital along certain broad lines and leaves the meaning open to numerous different constructions. As the determining of invested capital is the first step in computing one's excess profits taxes, much time and thought are being expended in vain endeavor, for it simply cannot be done until the commissioner of internal revenue makes certain vital rulings. The executives of several leading steel companies state they are utterly at a loss as to what their excess profits taxes will be, much as they would like to know, so that they might arrange their financial programs. It is desirable that business men soon be given information that will enable them to estimate their taxes and lay aside amounts accordingly to take care of these taxes so that they will know what part of their profits they may reinvest in plant, what part distribute to stockholders and what part add to surplus.

Advises Estimates are Futile

The machinery section of the National Supply and Machinery Dealers' association was given the benefit of expert advice at its meeting in the Hotel Astor, New York, last week, by means of an address prepared by William Bingham Kay, president of the Tax Audit Co., and formerly chief of the bureau of corporations of the auditor general's department of Pennsylvania. The principal conclusion to be drawn from M. Kay's address is that it is a waste of time now for a business man to try to estimate his excess profits tax. The paper follows in part:

"It is believed, and therefore so averred, that in assigning this subject your committee had particularly in mind the effect upon business houses of the new war taxes. If so, let it first be said that no wise man, be he lawyer or tax specialist, will at this time venture to speak oracularly concerning the new law unless in the most general way. The English of the new war tax law, as of the older income tax law, is muddy. Where more than one construction of the language is possible there can be no certainty, until a ruling has been made, which of the possible constructions is to have official approval.

"The truth is, that the officer who rules a new tax law has, in many cases, almost as much to do with the practical making of the law as had the man who drew it. His mind may be no better, his experience no greater, his judgment no sounder than that of a thousand men who dissent from his view of the law's meaning; but he happens to be in the place of power and his word is law—until the courts have said to the contrary. The practical tax specialist regards the law as having a relative value of perhaps 60 per cent, rulings as having a value of about 25 per cent, and office customs or practice as having a value of something like 15 per cent.

"In matters of taxation, as in some other matters, the statute merely is the skeleton upon or about which the complex structure of decisions, rulings and practice is to be built. It supports and gives general form to that structure when completed, but it is just as impossible to forecast, from examination of a new tax statute, the exact things that will happen in ruling and practice as it is to determine from examination of a human skeleton in a museum, whether the deceased had red hair, or blue eyes, or wore whiskers, or had corns, or liked ginger ale with his Scotch.

"In a general way, it may be said that in taking any action in view of the new law, business houses should be cautious. Especially should they avoid the making of any entries unusual in their practice unless there are the most valid of reasons for them. In view of the drastic character of the law and the government's great need for revenue, it is to be anticipated that the treasury department will look more closely into the account of those who file returns than at any past time. If in the taxable year there have been any unusual transactions affecting the net income it will be the part of wisdom for the taxpayer to attach to his return a full and frank statement concerning them. He may honestly think them entirely proper; but the government may not, and his explanation will be conclusive of his good faith. More than one man has to pay a heavy penalty for making a return which he believed to be entirely proper, but which the United States thought highly improper.

Capital Strictly Defined

"Certain features of the new law seem to be quite clear. For example, it seems to be plain that 'invested capital', as dealt with in the war excess profits tax, has reference only to capital, strictly considered, and not to be whole amount of money or property employed in the business. A company which began with paid-in capital of $100,000 and which has a surplus of $25,000 and undivided profits carried over into the taxable year of $5000, has an invested capital of $130,000. It may be that the company has an outstanding bond issue of $50,000 and so has capital of $180-000 actually employed in the business, but the borrowed money is not capital with the meaning of the law and cannot be used as such in computation of the rate of net earning. Neither can profits accumulated during the year and actually employed in the business be treated as invested capital, for by the terms of the act they are specifically excluded.

"If new capital is invested in the year, the company will get the benefit of it, in determination of the rate of net earnings only for the part of the year elapsing after its investment. The invested capital is to be averaged monthly and the average for the year is used in computing the earning rate.

"It is to be borne in mind that if any part of the invested capital is invested in stocks or bonds the income from which is exempt from tax, the amount so invested cannot be

considered as invested capital for the purposes of the excess profits tax. Therefore, capital invested in the bonds of any state, county, city or school district or in bonds of the first Liberty loan must be deducted from the whole invested capital for the purpose of arriving at the 'invested capital' contemplated by the new law. The reason for this provision is plain enough, and the provision is equitable. The law already has exempted from taxation the income from such bonds, so that no part of the income arising from them is included in the income to be taxed. Therefore, it is fair to exclude them for 'invested capital' for the purpose of fixing the rate of net earning. Obviously, no capital in excess of that employed in earning the net income subject to tax, should be considered in assessing the tax. This provision of the law seems to have struck many persons as entirely arbitrary, but it is logical and right. If congress were as careful to employ equity and logic when they would redound to the benefit of the taxable, there would be less complaint.

"Many persons inquire whether earnings accrued since the beginning of this year can now be invested in the second Liberty loan and so be included, for a portion of the year, as invested capital. The answer is that, if the law be ruled as it reads, they cannot.

Comparison is Ridiculous

"The war excess profits tax is ridiculous in its labored requirement of a comparison of net earnings and invested capital in the pre-war period, with net earnings and invested capital in the taxable year. No matter what such a comparison may show, the corporation or firm is allowed a deduction of at least 7 per cent on its invested capital in addition to the specific deduction, and of not more than 9 per cent thereon. The only range is between 7 and 9 per cent, a possible difference of 2 per cent. In view of the immense amount of work involved in preparation and examination of the figures required by this feature of the law, the game hardly is worth the candle. It would have been better to provide a flat deduction of 8 per cent, as in the law approved last April, and thus to have avoided necessity for all this work. Your speaker predicts that this part of the law is going to cause more trouble and give rise to more dissatisfaction than any other feature, and that it will be amended at the first opportunity. Because of the ponderous method it provides, and because of the very muddy language in which it is provided, it has received an amount of attention to which its importance does not entitle it. We find that it has confused many business people, not only as to itself, but as to the whole law. Entangled in doubt concerning it, they feel that the entire act is a mystery, and so give it up in despair as a bad job."

Bonuses Are Attacked By Carbon Steel Holders

Certain stockholders of the Carbon Steel Co. are protesting against the payment of bonuses to the officers of their company and a special committee of their number is soliciting proxies for the annual meeting which will take place in Pittsburgh, Nov. 14. Walter D. Uptegraff, chairman of the Union Switch & Signal Co., heads the committee. "As a result of actions already taken in your interest by the committee," says the communication, "the management has issued a special report which announces that the resolutions for current bonuses have been abandoned. Do not be misled by this special report, which makes no mention of cash bonuses already paid to officers, amounting to $512,518, which is in excess of 10 per cent of the entire capital stock of the company." The other members of the committee are: Woodward Babcock, of Harris Winthrop & Co.; Paul M. Whelan, of John Muir & Co.; E. F. Dunham, of Dunham & Co.; and James C. Bennett, of the Westinghouse Electric & Mfg. Co.

In the special report of the management, it is pointed out that on April 1, 1912, the company had a bonded debtedness of $700,000 and a floating debt of approximately $1,000,000. Today the surplus is approximately $3,000,000 and the bonded debtedness amounts to $324,000 and a purchase money mortgage for real estate of $140,000. This prosperous condition, it is pointed out, resulted from the obtaining of a $9,000,000 munitions contract for the British government which netted a profit of more than $2,000,000 over and above the reasonable profit for the steel so used. Charles McKnight, president of the company, obtained this contract. Because of this, and in lieu of salary increases, he was granted by the board a bonus of 20 per cent of the net profits on the munitions contract, which were to be determined after an allowance of the full market price for the steel. This bonus was to be distributed by President McKnight among the other officers of the company.

The Carbon Steel Co.'s annual report for the year ending Sept. 30 shows net profits of $2,234,545, a decrease of $865,000 from previous year.

Crucible Steel's Surplus Cut by Dividends

A decrease of approximately $6,000,000 in the surplus of the Crucible Steel Co. for the year ending Aug. 31 is shown in the annual report just issued. This highly unfavorable showing, however, is accounted for by the fact that during the year $5,821,000, or 18¾ per cent, was paid on back preferred dividends in addition to the regular dividend of 7 per cent. The report gives the surplus for the year as $4,719,858. A decline, although of much smaller proportions, also is shown in the net and gross profits for the year. The net profits aggregate $12,282,357, compared with $13,223,655 in 1916, while the gross profits amount to $16,161,237, against $16,258,748. During the fiscal year just ended $20,000,000 was spent for additions to property and working capital, which leaves on the balance sheets an unappropriated surplus of $6,263,000, or about $15,000,000 less than that of the previous year. The war taxes, it is estimated, will run between $6,000,000 and $7,000,000.

Following is a comparative statement:

	1917	1916
Gross profits	$16,161,237	$16,258,748
Net profits	12,282,357	13,223,655
Surp. after pref. divs.	4,719,858	11,098,655

Financial Crop Ends

The Massachusetts Saw Works, Springfield, Mass., has changed its name to the Victor Saw Works. There is no change whatever in the management.

* * *

With a view of providing additional working capital, the Youngstown Steel Car Co., Youngstown, O., has increased its capital stock from $100,000 to $250,000. The company now is working on a rush order of the government's for 500 dump cars for use in France.

* * *

For the third time within four months the plant of the Camden Iron Works, Camden, N. J., has been offered at public sale by Heuling Lippincott, receiver, without attracting any bids. Plans now are being formulated for operating the plant by the receiver.

* * *

The Hendee Mfg. Co., Springfield, Mass., has elected the following officers for the ensuing year: John F. Alvord, president; William E. Gilbert, vice president; Frank J. Weschler, treasurer and clerk; the foregoing and Edwin A. Carter, Charles E. Childs, Leon J. Harley Jr., and Carl O. Hedstrom, directors.

Nation Revises Tool Buying Method

Government's Machine Tool Requirements to be Handled by Central Bureau Consisting of Representatives of Army and Navy—New Arrangement to Lessen Conflicts and Expedite Deliveries—Canada Bars Machinery Exports

GOVERNMENT buying of machine tools has been organized along new lines which are expected to reduce the number of conflicts between departments and to expedite deliveries. Recently two men were appointed to take charge of all the machine tool requirements of the government; one representing the army, the other the navy. Each of these men has several subordinates in charge of the various divisions of his department, such as signal corps, ordnance, small arms, aircraft, etc. All government requirements are centered in one or the other of the department heads, who confer with each other to avoid conflicts. The machine tool division of the war industries board has compiled lists of all the machine tools to be built the next six months, and also has asked dealers to submit lists showing machines they have or expect to have in stock. When the government needs tools it consults these lists and communicates with the dealers who are thus known to have the requisite machines.

Crane Lists Issued

Several large lists of electric traveling cranes and hoists have been issued during the past week, in connection with the government's destroyer and cargo ship building and ordnance programs. The American International Corp. is inquiring for 45 three-ton electric hoists, 10 bracket type jib cranes, 30 mast type jib cranes and seven electric traveling cranes. The Stone & Webster Engineering Corp., Boston, on Oct. 31 opened bids on 46 electric traveling cranes for the Watertown arsenal, of the following carrying capacities: One 65-ton, two 20-ton, six 15-ton and thirty-seven 10-ton cranes. The Fore River Shipbuilding Corp. has awarded contracts for additional cranes against its reported requirements of about 80 cranes. In addition to the block of 27 electric cranes awarded the Cleveland Crane & Engineering Co., Cleveland, over a week ago, another block of 31 traveling cranes has been given to the Niles-Bement-Pond Co., 120 Broadway, New York, while several second-hand cranes have been ordered. The Federal Shipbuilding Co., 54 Dey street, New York, has not yet closed for the 10 electric cranes of the list issued about two weeks ago. The Terry Steam Turbine Co., Hartford, Conn., has closed for a 10-ton electric traveling crane. The Submarine Boat Corp. has awarded to the Ohio Locomotive Crane Co., Bucyrus, O., an order for seven locomotive cranes, of which four are to be 20-ton and three 25-ton.

Fabricators Need Equipment

Demand for punches, shears, bending rolls and other fabricating shop equipment continues active. Sellers say they are receiving a great number of miscellaneous orders, which aggregate a heavy total. The New York Shipbuilding Co., Camden, N. J., has placed large orders for this class of equipment the past week. The American International Corp. has a rather short list of fabricating equipment, its requirements along this line being light; as previously reported, it is expected that the American International Corp. will fabricate only about 5 per cent of its steel at its Hog Island, Pa., yard. Most of the work is to be done by outside fabricators. The Submarine Boat Corp. also has been buying fabricating shop equipment in a comparatively small way for its new yard near Newark, N. J.

Aircraft Builder Closes for Tools

The Wright-Martin Aircraft Corp., 40 Wall street, of which General George Goethals recently was made president, has begun buying machine tools for its plant at Plainfield, N. J. Orders for about $200,000 worth of machines were closed last week. This is the list issued by the Simplex Automobile Co., Wright-Martin subsidiary, which has been before the trade for some time.

Detroit reports state that the Dodge Bros., automobile manufacturers, have received a $30,000,000 ordnance contract and have started work on a plant to be completed next spring which will employ 8000 men. Dodge Bros. are said to be financing this project without outside assistance. The original plan to utilize the half completed plant of the Saxon Motor Co. has been abandoned. The Himoff Machine Co., Astoria, L. I., which has a government contract for gun mounts, has been buying machine tools the past week. The J. G. White Engineering Corp. has been awarded the general contract for constructing a $4,000,000 nitrate plant for the government at Sheffield, Ala. The bureau of yards and docks, navy department, has taken bids on a $1,000,000 machine shop to be constructed in Washington. The Worthington Pump & Machinery Corp., which received a large order from the government to supply pumps for naval vessels, is undertaking extensions to the plants of its various subsidiaries, including a new machine shop at Hazelton, Pa.

Dealers Sell Tools From Stock

SHIP BUILDERS' and munition makers' demands overshadow all others in the Chicago machine tool market at present, each seeking much heavy equipment. Precedence is being given to these demands and every machine tool seller has been called on for all the available equipment he has on his floors. Large lathes are hard to get. A recent sale of lathes to the Russell Motor Car Co., Boston, took all a local merchant had of 24 to 48-inch tools. General requirements for the Rock Island arsenal now being inquired for total close to $200,000. Bids have been taken on this list and orders are expected to be placed soon. The Edward Valve Co., Chicago, has a contract for 6-inch shells and has bought some additional tools. The Standard Steel Car Co. is inquiring for some added equipment, as it is preparing to do shell work. Shipyard requirements involve large boring mills, radial drills, planers and similar equipment. An inquiry from a manufacturer of 6-inch shells outside the Chicago district asks for 100 lathes to handle this class of work. The American Shipbuilding Co. is preparing to build a power plant at South Chicago. The Stand-

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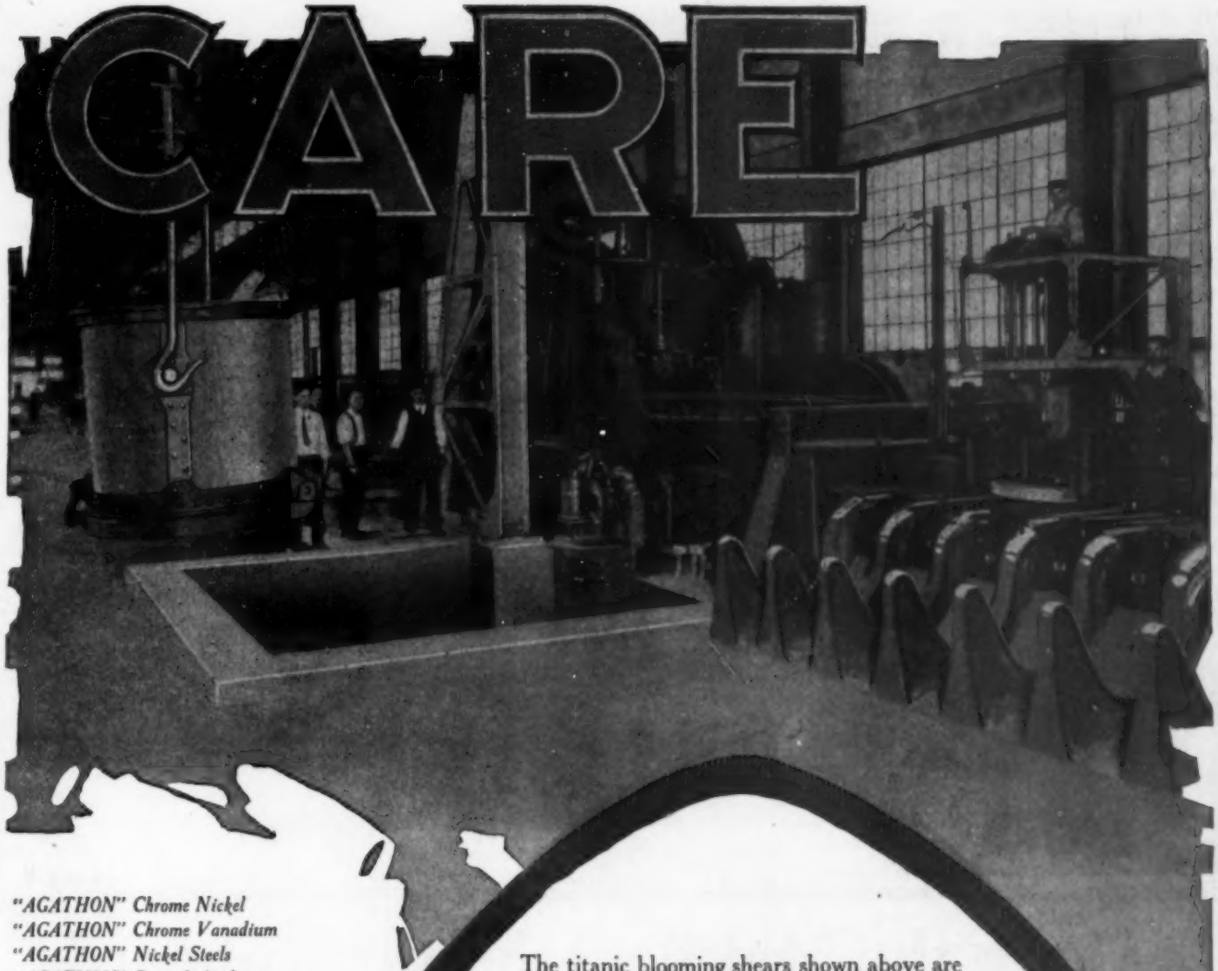

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The titanic blooming shears shown above are eloquent of the minute care which is exercised throughout the production of AGATHON Alloy Steels.

The powerful jaws of these shears bite off the ends of every billet and slab in order that there may be no chance for anything but sound steel going to the user—YOU.

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Cleveland Office: Hickox Building
The Hamill-Hickox Company, District Representatives
Chicago Office: 1370 People's Gas Building, 120 South Michigan Blvd., A. Schaeffer, District Sales Manager
Philadelphia Office: 603 Widener Building
Frank Wallace, District Sales Manager
J. E. Dockendorff & Co., 20 Broad St., New York
General Export Agents

AGATHON
ALLOY STEELS

AGATHON STEELS
TRADE MARK

Say you saw it in THE IRON TRADE REVIEW

ard Forging Co., Indiana Harbor, Ind., is building a forging plant to cost $400,000.

Canada to Keep Munition Plants Intact

AMERICAN munition makers who have been negotiating for the equipment of Canadian munition plants, which it has been said are to be dismantled now that England's output of war materials has been so greatly increased, will fail in their attempts to secure equipment, according to a recent report. Canadian shellmakers who have been making efforts to sell their equipment, it is said, have received word from the Canadian government not to dispose of their machine tools to interests outside of the dominion. The effects of this order may be felt in the American market in a stimulated demand for new tools, now that this large volume of used tools is not available. A further complication of the machine tool situation also may result. Dodge Bros., Detroit, who are building a new plant, are inquiring for munition-making equipment, to aggregate several million dollars. The Davis Sewing Machine Co., Dayton, O., has taken a contract to manufacture parts for the J. C. Best Gas Traction Co., San Leandro, Cal. The Davis company shortly will close for considerable new machinery. An inquiry has been made by the Ohio Steel Crane Co., Bucyrus, O., for a used 36 or 40-inch vertical boring mill. The Toledo & Ohio Central railroad, Toledo, O., is in need of a 6-foot radial drill. The Ohmer Fare Register Co., Dayton, O., closed a short time ago for several new tools. The Timken Roller Bearing Co., Canton, O., has purchased a site adjoining its plant to provide for contemplated extensions.

Heavy Orders Placed at Pittsburgh

MANUFACTURERS in the Pittsburgh district are placing heavy orders for machinery and machine tools for the production of government contracts. Private buying is extremely limited. The government today more thoroughly dominates the machine tool market than ever before. It has virtually taken over the industry. It is evident that the government is hastening at topmost speed to place into operation as soon as possible plants with which it has placed war contracts. Some of these plants are being completed in the Pittsburgh district, with government aid partly under its direction. So pressing is the need for machine tools that it is reported from a source considered to be reliable that munition making equipment is actually being shipped to America.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Kings County Iron & Foundry Co. has been chartered with $200,000 capital by T. E. Hodgskin, C. S. Woodman and J. Friedman, 20 Nassau street, New York.

BUFFALO, N. Y.—The Standard Oil Co., 20 Broadway, New York, has awarded the H. D. Best Co., 52 Vanderbilt avenue, New York, contract to erect a 5-story, reinforced concrete storage warehouse, to be 60 x 207 feet in size and to cost about $100,000.

BUFFALO. — The Hornespeed Propelling Co., 302 Main street, will build a factory for the manufacture of marine propellers, ventilators and other equipment. The company was recently incorporated with $1,000,000 capital.

BUFFALO.—The Buffalo Dry Dock Co., Ganson street, will build a 1-story, 100 x 100-foot machine shop. The contract has been awarded.

GAROGA, N. Y. — The Garoga Electric Power Co. has been incorporated with a capital of $200,000 by J. T. Norton, W. A. Dunne, G. C. LeCompte, Troy, and others.

LITTLE FALLS, N. Y. — The Henry Cheney Hammer Corp. has been incorporated with $100,000 capital by J. V. Hemstreet, K. E. Morgan and D. J. Williams.

LONG ISLAND CITY, L. I.—Plans have been filed by Louis Allen Abramson, architect, for a group of manufacturing buildings to be built on Ingraham street for the Continental Varnish Co.

NEW YORK.—The Blancke Twist Drill & Tool Co. has been incorporated with a capital of $500,000, by L. C. Blancke, C. Ter Meer, and A. J. Talley, 6 Mount Morris Park west.

NEW YORK.—The Master Steam Boiler Skimmer Co. has been incorporated with a capital of $50,000. The incorporators include T. B. Hustwick, W. J. Bauer and A. W. Palmer, 27 Cedar street.

NEW YORK.—The Public Service Power Co. has been organized with $250,000 capital to engage in a general engineering and hydro-electric development business. The incorporators include C. H. Stanton, J. F. Hory and W. W. Card, 32 Broadway.

NEW YORK. — The Dorothy Operating Corp. has been chartered with $150,000 capital to manufacture machinery, railroad and steamship apparatus, by M. L. Buchanan, J. A. Reilly and G. Denker, 80 Broad street.

NEW YORK.—The New Jersey Zinc Co. has awarded to H. M. Krumbhaar the contract for its $200,000 laboratory. Edgar Palmer, 55 Wall street, is president.

NEW YORK.—John Opitz Inc., has been organized with $200,000 capital to manufacture chemicals. The incorporators include C. F. Opitz and H. R. Opitz, Blissville.

NEW YORK. — The Reliance-Grant Elevator Equipment Corp. has been incorporated to manufacture elevators and hoisting machinery by J. L. Lockwood, R. C. Bennett and G. C. Tillotson, 2 Rector street. The company is capitalized at $50,000.

NEW YORK.—The Gerald G. Freeman Corp. has been organized with $100,000 capital to manufacture tools and hardware. The incorporators are G. H. Freeman, L. H. Ferber, 141 Broadway, and T. J. Mahoney.

NEW YORK.—The Eureka Specialty Mfg. Co. has been chartered with $100,000 capital to manufacture automobile accessories by W. H. David, Tottenville, M. W. Richard and E. M. Carlson, Yonkers.

NEW YORK.—The H. B. Shontz Co. has been incorporated with $50,000 capital to make electrical equipment by J. A. Smith, H. B. Shontz and P. J. Durham, 244 West Forty-ninth street.

NEW YORK.—The Motor Starter Corp. has been incorporated with $2,000,000 capital to manufacture motor starters, and will build a plant. S. McRoberts, 32 East Sixty-fourth street, is in charge.

TROY, N. Y.—The Rensselaer Polytechnic institute plans to erect an addition to its laboratory, to cost about $100,000.

BLOOMSBURG, PA. — The Columbia County Trust Co. has awarded to E. H. Sheets, Ritter building, Huntington, W. Va., the contract to erect a 4-story bank and office building to be 24 x 120 feet in size.

COLUMBIA, PA.—The Columbia Milling Co. has been chartered with $20,000 capital by Austin Boyd, Lansdowne.

DU BOIS, PA.—The city plans to erect a bridge over Sandy Lick creek on Brady street, to cost about $15,000. G. A. Flink, 301 Commonwealth Trust building, Harrisburg, is the engineer.

EAST PITTSBURGH, PA.—The Westinghouse Electric & Mfg. Co. will erect a $50,000 foundry. Prack & Perrine, Keystone

Business Talks with

ROLLING MILL JIM

Oh, Boy! Have you used any of those "Hubbard Special" steel rolls? They're always hungry for somethin' to eat up. Believe me, I'm running a restaurant for them. Get me?

So long—

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

building, Pittsburgh, are the architects.

PHILADELPHIA.—The Brown Instrument Co. has awarded to R. C. Ballinger & Co. the contract for the erection of an addition to its plant at Wayne and Roberts avenues.

PHILADELPHIA.—McCloskey and Bahls have been awarded the contract for the erection of a 1-story, 85 x 90-foot storage building at the navy yard.

PHILADELPHIA.—S. G. Barker & Son, Inc., has been incorporated with a capital of $10,000 to deal in foundry supplies. T. M. Voyle, Scranton, is in charge.

PHILADELPHIA. — The Lindsey Hyden Co. has awarded to Robert Beatty the contract for the erection of a 1-story brick machine shop addition at 2130 East York street.

PHILADELPHIA.—The L. L. Allen Co. has let a contract to F. B. Davis for the erection of a manufacturing addition at Fifth street and Greenwood avenue.

PHILADELPHIA.—M. Ward Eastby has been awarded a contract to erect a 1-story, 58 x 84 foot shed for the Ajax Metal Co.

PHILADELPHIA.—The L. Allen Co. has been granted a permit for the erection of a factory addition at Fifth street and Glenwood avenue.

PHILADELPHIA.—John G. Gray has been granted a permit to erect a factory addition at 62 West Johnson street.

PITTSBURGH. — W. S. Rae has been awarded the contract for the Main street bridge, Butler, Pa., by the Pennsylvania Public Service commission, on a bid of $184,198.45.

READING, PA.—The Reading Chain Block Co. is erecting an auxiliary building at a cost of $25,000.

SHARON, PA. — The Savage Arms Co. plans to erect an addition to its forge shop, to be 280 feet in length.

BELMAR, N. J.—The International Safety Railway Tie Co. has been chartered with $1,000,000 capital to manufacture safety ties by Harry S. Ishman, George A. Howes, Maurice W. Boyer and William C. Greenough.

CAMDEN, N. J.—The Waverly Chemical Co. recently experienced a heavy loss by fire.

CAMDEN, N. J.—The McLaughlin Tool Co., recently incorporated with $50,000 capital, will build a plant for the manufacture of tools. The incorporators include W. J. McLaughlin and J. Scott, 549 North 2 street.

HARRISON, N. J.—W. Ames & Co., manufacturers of bolts will erect a 1-story addition to cost $6000.

JERSEY CITY, N. J.—The Davis-Bournonville Co. has awarded a contract to John N. Gill & Co., for a 4-story, 59 x 100-foot brick and concrete factory building.

MANVILLE, N. J.—The H. W. Johns-Manville Co. plans a 3-story, 50 x 150-foot addition to cost $100,000.

NEW BRUNSWICK, N. J.—The Middlesex Engineering & Construction Co. has been incorporated with a capital of $25,000. The incorporators include Edwin S. Gleason, D. E. Corbett, and George E. Murray, Metuchen, N. J.

NEW MARKET, N. J.—The Reade Mfg. Co., 1023 Grand street, Hoboken, recently incorporated with $30,000 capital has purchased an 11-acre site to build a plant for refining cobalt, nickel, and arsenious ore.

NEWARK, N. J.—The Newark Machine & Engineering Co. has been chartered with $100,000 capital to deal in machinery by Emanual P. Scheck, Lewis Fisher and others.

NEWARK, N. J.—The Barlow Foundry Co., 551 New Jersey Railroad avenue, will build a 1-story brick and steel foundry on Hunter street, to cost about $20,000.

NEWARK, N. J.—The Edel Laboratories Co., Inc., has been chartered with $50,000 capital to manufacture and deal in chemicals by Albert E. Edel, E. H. Schwartz and M. E. Crawley.

NEWARK, N. J.—The Schoellner & Horbach Mfg. Co. has been chartered with $125,000 capital to manufacture and deal in chemicals by Karl A. Horbach, John M. Schoellner and Joseph P. Rowley.

NEWARK, N. J.—The Lackawanna Bridge Co., Port Newark terminal, will erect two brick and steel storage buildings, 1-story high, and 60 x 60 feet in size. Two brick and steel factory buildings, 1-story high and 60 x 630 feet in size, to cost $280,000 will be erected also.

TRENTON, N. J.—The Niasco Chemical Co. has been chartered with a capital of $250,000 to manufacture chemicals. The incorporators include Henry J. Camby, R. E. Hetel and F. Frankenoff, Hoboken.

TRENTON, N. J.—The Black Rock Mining Co. has been incorporated with a capital of $20,000. The incorporators include Frederick K. Sheesley and Charles Munson, of Dover, Del.

DOVER, DEL.—The Ice Making Refrigerator Co. has been organized with $1,500,000 capital to manufacture refrigerating machinery by Fred W. Wolf, V. A. Johnson and G. W. Friend, Chicago.

DOVER, DEL.—The Connecticut Brass & Mfg. Co. has been incorporated with a capital of $4,000,000 by C. M. Rimlinger, M. M. Clancy and Clement M. Egner of Wilmington, Del.

DOVER, DEL.—The Black River Iron Mining Co. has been chartered with $20,000 capital to mine ore by Edward G. Lewis, Frederick K. Sheesley, William A. Perry, Charles Munson and E. E. Cramer, Dover.

WILMINGTON, DEL. — The Pusey & Jones Co., which recently was reorganized, has been granted permits for the erection of new buildings to cost about $150,000. The company has contracts on hand for a large number of vessels.

WILMINGTON, DEL. — The Handee Wrench Mfg. Co. has been chartered with $200,000 capital to manufacture wrenches and tools. The incorporators include A. M. Halloran, S. A. Williams and Ferris Giles.

WILMINGTON, DEL. — The Continental Construction Corp. has been chartered with $100,000 capital to manufacture railway supplies by C. L. Rimlinger, M. M. Clancy, Wilmington, and Clement M. Egner, Elkton, Maryland.

BALTIMORE.—The Poole Engineering & Machine Co. has awarded the contract for a 1-story ordnance building to cost $500,000.

Among New England Factories

PORTLAND, ME. — The United States Auto Gear-Shift Co. has been incorporated to make gear shifting devices with $1,500,000 capital by Clarence G. Trott, P. B. Drew and T. L. Croteau.

BOSTON.—The factory of the Globe Tanning Co. in the Roxbury district was damaged by fire Oct. 27 with a loss of $20,000.

BOSTON.—C. S. Ransom, Inc., has been incorporated with $50,000 capital to make automobiles by Charles S. Ransom, Orlando P. Liscom and Henry D. Nunn.

BOSTON. — The Perry-Buxton-Doane Co. will build a brick and concrete, 1-story, 42 x 144-foot factory at 216 West First street, South Boston, Mass.

CAMBRIDGE, MASS. — The Cambridge Smelting Co. has been incorporated with $50,000 capital by David Finkelstein, Louis D. Covich and James H. Jones.

FITCHBURG, MASS. — The Shirreffs Worsted Co. has let the contract for a 2-story, 52 x 52-foot storehouse.

MANSFIELD, MASS.—The Harding Mfg. Co., maker of tools, will rebuild its plant shortly.

REVERE, MASS. — The Adams-Holland Electric Co. has been incorporated with a capital of $25,000 by James Buchanan Jr., and Alfred T. Timayenis, to make electrical machinery.

SOMERVILLE, MASS.—The Gile Marine Engine Co., Boston, has let the contract for a brick, 1-story, 60 x 100-foot machine shop on Middlesex avenue.

PROVIDENCE, R. I.—The Eastern Coal Co. has let the contract for a brick, steel and concrete storage building at Point and Eddy streets, to be 2 stories high and 66 x 81 feet in size.

PROVIDENCE, R. I. — The Fore River Shipbuilding Corp., 97 Howard street, Quincy, Mass., has awarded the contract for a shipbuilding plant to cost about $1,300,000.

WOONSOCKET, R. I. — The Fairmount Foundry Co. has let the contract for a 1-story, 70 x 85-foot addition on Third avenue.

BETHEL, CONN.—The George A. Shepard Sons Co. has let the contract for a 2-story, 60 x 120-foot addition to its tannery.

HARTFORD, CONN. — Hartford county contemplates building a brick and steel, fireproof, county jail to cost $700,000.

MIDDLETOWN, CONN. — The Russell Mfg. Co. has let the contracts for a brick and concrete, 2-story, 50 x 80-foot mill; a 3-story, 48 x 144-foot storehouse, and a 1-story boiler house.

NEW BRITAIN, CONN.—Plans are being drawn for a brick, mill construction, 1-story, 50 x 317-foot addition to the factory of the Landers, Frary & Clark Mfg. Co., at Elm and Commercial streets.

How much is Prompt Delivery worth to You?

SMALL STEEL CASTINGS

This is what we call *Prompt* DELIVERY:

The other morning a man came into our office. He wanted quite a number of 15 pound castings—***and he wanted them quick!***

Well, he got 25 of them that same day. After that we shipped him 100 a day until the order was completed.

We are often called upon to act as "life-savers"—and we pride ourselves on being able to make good.

One of the great secrets of our making good is the fact that we always keep 30% of our capacity open for emergency work.

Isn't such emergency service worth something to you—especially when quality is thoroughly guaranteed to be second to none?

When you need

SMALL STEEL CASTINGS

for

Tractor Work, Machine Tool Work,
Truck Work, etc.

also

Blank Gears, and Carbonizing and
Case Hardening Boxes,

WRITE US

Farrell-Cheek Steel Foundry Co.

Sandusky, Ohio

BRANCH OFFICES:

New York Philadelphia Chicago

Activities in the Central States

DE PERE, WIS.—The DePere Mfg. Co., which recently booked an order for 55 marine boilers for the Emergency Fleet Corp. is planning to erect a shop addition which will cost $35,000 with equipment.

HORICON, WIS.—The Van Brunt Mfg. Co., owned by the Deere & Co. interests, and manufacturing farm implements, is erecting a 3-story addition, 60 x 120 feet.

KENOSHA, WIS. — Architects White & White are preparing plans for a $100,000 theater and office building, 65 x 125 feet, for A. Mies, Wisconsin street. Bids will be taken about Nov. 1.

MADISON, WIS.—The Four Lakes Ordnance Co. has been incorporated with a capital of $100,000, and will build a plant at once. The incorporators include George A. Steinle of the Steinle Turret Machine Co., Sanford P. Starks and William R. Bagley.

MILWAUKEE.—The Fraser Co., 667 East Water street, mill architect and engineer, will take bids about Nov. 1 for the construction of a reinforced concrete elevator, warehouse and cleaning plant costing $200,000 for the L. Teweles Seed Co., 113 Clybourn street. It will be seven stories high and 150 x 175 feet in size.

DETROIT. — The Tager Machine Co., George F. Tager, manager, is building an addition 21 x 77 feet.

DETROIT.—Murphy & Hanford, 206 New Telegraph building, have completed plans for a factory of three units for the C. R. Wilson Body Co. The structure will be 1-story high and cost $150,000.

DETROIT.—The General Metals Co. has been chartered with a capital of $100,000 by H. C. McArtney, Frederick N. Rosenstengel, Frederick L. Sattley and others.

DETROIT.—The Hessian Tiller & Tractor Co. will build a factory. Peter Hacquebart, 264 East Jefferson avenue, is engineer.

GRAND HAVEN, MICH.—The Hamilton Motor Co. has been incorporated with $500,000 capital to manufacture the Panhard truck.

JACKSON, MICH. — The Walcott Lathe Co., Jackson and Calhoun streets, will build an addition. M. C. Townley is manager.

LAKEVIEW, MICH.—Bids are being received for a waterworks system, including a steel tank and tower, pump and motor, to cost $12,000. F. L. Stebbins is village manager.

MANISTEE, MICH.—The Manistee Shipbuilding Co. is contracting for new machinery to cost $60,000, for use in rebuilding lake vessels for coastwise trade.

MUSKEGON, MICH.—The Advance Brass Mfg. Co. has been formed by Walloch Foote and Oscar Berg to make brass castings. Alex. G. Wilson is general manager.

PONTIAC, MICH.—The Wilson Foundry & Machine Co. is receiving bids for a tire mold building to cost about $30,000. C. D. Wilson is president.

SAGINAW, MICH.—Wickes Bros. plan to add a foundry to their plant.

BELLEVILLE, ILL. — The J. C. Born Machine & Foundry Co. has been incorporated with $10,000 capital by John C. Born, William F. Born and E. W. Twenhoefel.

CHICAGO.—The Coburn Steel & Supply Co. has been chartered with $10,000 capital by Frederick Zecord, J. Walter Stead and G. E. Kerr.

CHICAGO.—The Keith Railway Equipment Co., 1353 Peoples Gas building, successor to the Keith Car Co., has bought 35 acres at Hammond, Ind., and will erect a plant for building and repairing tank cars.

CHICAGO.—The Decker Mfg. & Tractor Co. has been incorporated with $200,000 capital to manufacture tractors and machinery by Harry Lewis, J. G. Burns, and John A. Decker.

CHICAGO. — The American Shipbuilding Co. will build a power plant 35 x 100 feet at East 101st street and the Calumet river. H. A. Christy is president.

CHICAGO. — The Chicago Universal Cement Mold Co. has been incorporated with $50,000 capital by Jacob Mullin Thompson, Henry Van Houston, and Johanna S. Becker.

DECATUR, ILL.—The Wagner Castings Co. has been incorporated with $40,000 capital by Albert W. Wagner, Thomas W. Samuels and Charles C. Leforgee.

HIGHLAND PARK, ILL. — Plans have been completed for a steel girder and reinforced concrete bridge consisting of five spans, to cost $25,000. Charles Russell, Waukegan, is county engineer.

LITCHFIELD, ILL.—The Illinois Central railroad is preparing plans for a combination freight and passenger station which will cost about $35,000. The building will be a 1-story structure, 30 x 120 feet in size.

PEORIA, ILL.—The Auto Collapsible Rim Mfg. Co. has been incorporated with $100,000 capital by E. D. Bauman, H. P. Rucker and D. M. Bauman.

PEKIN, ILL.—The Edwards Cylinder Mfg. Co. has been incorporated with $10,000 capital to manufacture cylinders and supplies by N. H. Lee, Charles R. Edwards and D. H. Learned.

QUINCY, ILL.—The Moorman Mfg. Co., E. V. Moorman, president, is planning a 2-story factory addition, 50 x 146 feet in size, to cost $80,000.

FORT WAYNE, IND.—The Bedford Stone & Construction Co. has been awarded the general contract for the construction of a 5-story concrete building for the General Electric Co.

INDIANAPOLIS.—The Rotary Mfg. Corp. has been incorporated to manufacture farm machinery and auto vehicles. The company is capitalized at $250,000 and its incorporators include W. W. Hare, C. O. Bertram and B. H. Bertram.

INDIANAPOLIS.—The Stutz Motor Car Co. is building a 1-story machine shop to cost $38,000.

INDIANA HARBOR, IND.—The Standard Forging Co. is building a forging plant to cost $400,000.

CANTON, O.—The Timken Roller Bearing Co. has purchased a site adjoining its plant for an addition to its steel mill and to provide for other contemplated extensions.

CLEVELAND.—The Willis Mfg. Co. has

Business Barometers Give Encouragement

The Wellman-Seaver-Morgan Co., Cleveland, announces the establishment of a Seattle office at 1317-1318 *L. C. Smith building. Mr. Glenville A. Collins has been named branch manager.*

The Moline Automobile Co., Moline, Ill., has been consolidated with the Root & Van Dervoort Engineering Co., East Moline, Ill.

The Clark Metal & Ore Co., Pittsburgh, has removed its offices to more commodious quarters at 421-423 *Park building.*

The assets of the Queen City Foundry Co., Toronto, Ont., have been purchased by the Bond Foundry & Machine Co., Manheim, Pa. The Canadian division will be known as the Bond Engineering Works, Ltd.

An announcement has been made by the Laughlin-Barney Machinery Co., Pittsburgh, of the removal of their offices to 481 *Union Arcade.*

The Stewart Mfg. Co., 323 *Wells street, Chicago, manufacturer of die castings, has changed its name to the J. K. Stewart Specialty Co.*

The Fulton-Kenova Mine Car Co., mine cars and mine supplies has announced the opening of Cleveland offices at 1035 *Guardian building. The company was formed by a consolidation of the Fulton Pit Car & Mfg. Co., Canal Fulton, O., and the Kenova Mine Car Co., Kenova, W. Va.*

Hamilton & Hansell, engineers, announce that owing to increased business they have moved their offices to 13-21 *Park Row building, New York.*

On account of having largely increased the capacity of
our plant for the next 12 months we have the following

OPEN TONNAGE

2500 TONS ANNEALED STEEL

3000 TONS MALLEABLE IRON

We want to contract this extra capacity.

Send us your requirements and specifications for prices.

Our STEEL has tensile strength of 80,000 lbs., is true to pattern and free from blow holes and it machines as well as a drop forging.

Our MALLEABLE has tensile strength of 45,000 lbs. to 53,000 lbs. and is thoroughly annealed.

THE INLAND STEEL CASTINGS CO.

Annealed Steel and Malleable Castings

TERRE HAUTE, IND.

New York Sales Office
MURCOTT & CO.
253 Broadway

Detroit Sales Office
GENERAL CASTINGS CO.
326 Ford Bldg.

Pittsburg Sales Office
RELIANCE MACHINERY CO.
207-8 Fulton Bldg.

Los Angeles Sales Office
ALLAN WETMORE
702 Spring St.

been chartered with a capital stock of $100,000 to manufacture electrical devices. The incorporators are Herbert A. Spring, Howard F. Burns, M. G. Egan, M. I. Scott and L. A. O'Neill.

CLEVELAND.—The Electric Motors Co. has been organized with a capital stock of $25,000. The incorporators are George R. Brown, W. K. Stanley, Samuel Horwitz, M. A. Friedman and Fred J. Young.

CLEVELAND.—The Toledo Plate & Window Glass Co. will build a $150,000 factory on a site it has recently purchased at St. Clair avenue and East Thirtieth street. Walker & Weeks, 1900 Euclid avenue, are the architects.

CLEVELAND.—The Standard Steel Castings Co., 3311 West Seventy-third street, has purchased 20 acres and will erect a 300 x 300-foot plant to cost $300,000. The company has a contract to furnish cast steel truck wheels for the government, and the construction of its new plant will be rushed to completion.

CLEVELAND.—The Scott Machine Co. has awarded to the William Dunbar Co. the contract for a 1-story, 60 x 166-foot machine shop at West Fourteenth street and Locust avenue, to cost about $23,000.

CLEVELAND.—The Dual Carburetor & Mfg. Co., which has been incorporated with a capital of $100,000 to manufacture carburetors, will build a plant shortly. G. F. Hart, Guardian Savings & Trust Co. is in charge.

DAYTON, O.—The Dayton Aluminum & Mfg. Co. has been chartered with $10,000 capital by Leo. A. Stotter, Carl Wilke, L. A. Jacobson and others.

YOUNGSTOWN, O.—The Home Savings & Loan Co. plans to erect a 10-story office building.

YOUNGSTOWN, O.—The Youngstown & Suburban railroad plans to erect a power plant at Southern Park and an addition to the plant at South Side Park.

YOUNGSTOWN, O. — The Automatic Sprinkler Co., Brittain street, has purchased a 1-acre site and plans to erect an addition to its plant, to cost about $50,000.

BLUEFIELD, W. VA. — The National stock of $25,000. The incorporators include W. H. Morgan, T. L. Morgan, D. S. Morgan Armature & Electric Works has been incorporated with a capital stock of $25,000 by P. J. Kelley, G. E. Stupalsky, C. L. Brown, B. H. Kelley and C. L. Craise.

CLARKSBURG, W. VA. — The Liberty Carbon Co. has been incorporated with a capital stock of $100,000, to manufacture carbon black by Joseph A. Wetherell, W. R. Fowkes, S. J. McConnell, Phillip Steptoe and J. Fred Neill.

Western and Intermountain Territory

LITTLE FALLS, MINN.—Bids will be received until Nov. 6 by B. N. McNeary, county auditor, for the Royalton Mississippi bridge to consist of two 130-foot and one 140-foot truss spans.

MINNEAPOLIS. — Bids will be received until Nov. 12 by L. P. Erickson, county auditor, for a steel bridge with bascule or direct lift steel span of 130 feet and two 90-foot steel approaches.

CHARLES CITY, IOWA. — The forging and boring departments of the Hart-Parr Co. have been damaged by fire with a loss of about $500,000. C. W. Hart is president.

PELLA, IOWA. — The Pella-Leffler Short Line has been incorporated with a capital stock of $300,000 to build a line from Pella to Wabash, a distance of 4½ miles.

KANSAS CITY, MO.—The Milwaukee Corrugating Co., 911 West Eighth street, will build a plant for the manufacture of sheet metal products. The plant will cost about $90,000.

KANSAS CITY, MO. — The Kansas City Light & Power Co. has awarded all contracts for the construction of its $4,000,000 power plant at the foot of Brooklyn avenue. Sargent & Lundy are the engineers.

LITTLE ROCK, ARK. — The Arkansas Water Co., 112 West Fourth street, will spend $100,000 enlarging its plant and remodeling its pumping station.

AMARILLO, TEX.—The Texas Tractor & Farm Machinery Co. has been incorporated with $10,000 capital by J. .R. Merriwether, P. F. Gruver and T. B. Hill, Lockney, Tex.

FORT WORTH, TEX.—An election will be held soon on issuing $200,000 in bonds for a viaduct at Jennings avenue.

WALTERS, OKLA. — The Chicago, Rock Island & Pacific railroad, C. A. Morse, chief engineer, will construct a passenger station to replace that recently damaged by fire.

WIRT, OKLA.—The Oil Casing Closing Machine Co. has been incorporated with $12,000 capital by James Scanlin, P. A. Arnold and G. D. Chastain.

ARMA, KANS.—Plans are being drawn by A. C. Moore, engineer, Joplin, Mo., for a waterworks system to cost $25,000, for which bonds will be sold.

OMAHA, NEBR.—The Bowen Motor Railways Co. has been incorporated with $100,000 capital to build motor and freight cars. The incorporators include A. D. Bowen and Carl T. Self.

MALTA, MONT. — George W. Kemper, Minot, has been awarded the contract for installing the municipal electric light system, at the contract price of $39,000.

BOISE, IDAHO. — The Missouri Valley Bridge & Iron Co. has been awarded the contract for three steel bridges and several reinforced concrete culverts on the Mackay-Challis highway by the state highway commission. The contract price was $35,700.

SALT LAKE CITY, UTAH.—The Capital Iron & Metal Co., recently incorporated with a capital stock of $35,000 is erecting a $10,000 warehouse and office.

New Business in Eastern Canada

ONYOX, B. C.—Construction work will be commenced immediately on a coke oven plant for the Granby Consolidated Mining, Smelting & Power Co., 718 Granville street, Vancouver, B. C., to cost $1,500,000.

VANCOUVER, B. C.—The Northern Construction Co. is receiving bids on 200 tons of reinforcing steel to be used in the construction of a concrete platform and train shed for the Canadian Pacific railroad.

BRANTFORD, ONT.—The Dominion Steel Products Co. has secured contract for building heavy machinery for 100 merchant ships. A large addition to its plant will be built and considerable new machinery and equipment will be installed.

GALT, ONT.—The foundry of Clare Bros. was badly damaged by fire with a loss of $15,000 to building and equipment.

HASTINGS, ONT.—The plant of the Hastings Tanning Co. has been totally destroyed by fire with a $200,000 loss to building and machinery.

HAMILTON, ONT.—The Canada Screw Co., 334 Wellington street, has awarded the contract for the erection of a new addition to its factory, to cost $100,000.

TORONTO, ONT.—The Heating Specialty Co. has been incorporated to manufacture stoves, with $50,000 capital by James Parrish, Samuel Egan, William A. Ross and others.

TORONTO, ONT. — The B. J. Johnson Soap Co. has secured a permit to erect a 2-story factory 82 x 200 feet, to cost $110,000.

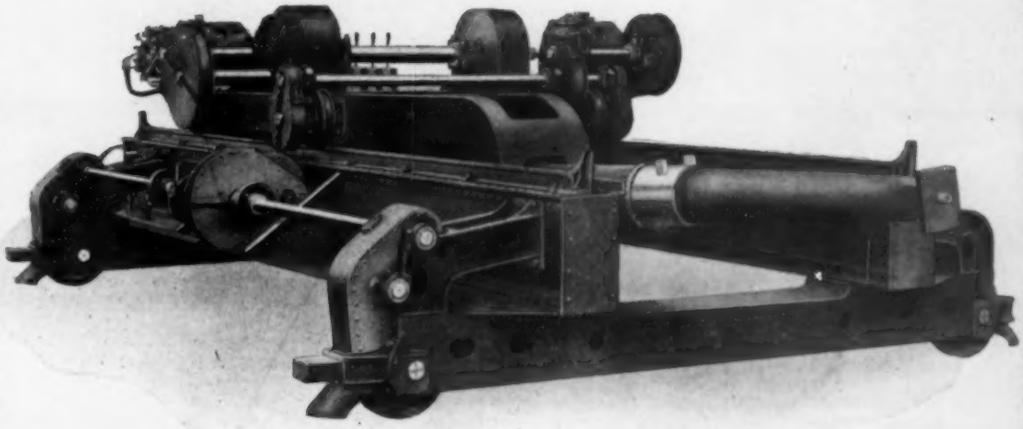
TORONTO, ONT.—The Railway & Power Engineering Corp. has been incorporated to engage in general engineering work with $50,000 capital stock. The directors include Theodore Malm, Gerard Ruel and Frederick C. Allen.

TORONTO, ONT.—J. G. and Harry Erd, of the Erd Motor Co., Saginaw, Mich., will take charge of the Chief Motor Co., a $250,000 corporation formed to manufacture motor trucks, tractors and marine motors. A new plant will be built.

TORONTO, ONT. — The Canadian Fairbanks-Morse Co., Bloor street west, will build an addition to its hydraulic building to cost $30,000.

CEDARS, QUE.—The Cedar Rapids Mfg. & Power Co., 83 Craig street, Montreal, Que., will build an addition to its power plant at Cedars to cost $450,000.

ILE PERROT, QUE.—The shell loading plant of the Canadian Explosives Co. was ruined by fire Oct. 26, with a loss of $1,600,000 to building and machinery.



Low Type Chargers

The Wellman Patented Open Hearth Charging Machines have become famous by merit alone, not only in America, but also in practically every country where the Open Hearth Process is in use.

The low type charger pictured above is one of several built for the Indiana Steel Company. The machine's rigid structure makes for long life in heavy service; its general flatness of build allows free use of the ladle overhead, when furnaces are being charged with hot metal; yet its relatively high space between trolley frame and floor gives it easy passage over tools and other small objects.

For steel mill equipment of the better class, you can do no better than to consult with our engineers.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

MONTREAL, QUE.—The Montreal Shipbuilders, Ltd., has been incorporated to build ships with $300,000 capital by Errol M. Macdougall, S. C. Demers, Leslie G. Bell and others.

MONTREAL, QUE. — The Sino-North American Co. has been incorporated to carry on a general mining business with $1,000,000 capital by Walter R. L. Shanks, Francis G. Bush, Herbert W. Jackson and others.

QUEBEC, QUE.—The Warwick Machine Co. has been incorporated to manufacture agricultural implements and machinery with $100,000 capital by Joseph E. Julien, Samuel Fleury, Joseph A. Boule and others.

THREE RIVERS, QUE.—Fred J. Argall, 32 Des Forges street, plans to organize a wooden shipbuilding company and establish a plant.

SYDNEY, N. S.—The Sydney Foundry & Machine Co. will build a foundry at Halifax to cost $7500.

WINNIPEG, MAN.—Bids covering work to cost $1,250,000 will be taken at an early date by the administration board of the greater Winnipeg water district.

New Trade Publications

SAWS.—A novel 12-page bulletin, recently published by the Simonds Mfg. Co., Fitchburg, Mass., pictures and describes the adventures of "Sammy Showme", an engaging individual who is said to have visited various manufacturing plants in quest of information regarding the use of saws. The bulletin, in relating "Sammy's" experiences, mentions various applications of hack saws and circular saws in shell-making, screw slotting, and cutting-off work.

SOLDERING FLUX.—Hess & Son, Philadelphia, explain the uses and state the advantages of a soldering flux paste for copper, brass, iron, steel and other metals in a folder recently issued. It is claimed that the paste, in evaporating, leaves behind it a thin coating of clean bright tin to which the solder will readily cling. The paste is said to be non-corrosive and will not injure silk insulation on electric wires.

SAND MIXERS.—The Sand Mixing Machine Co., Inc., New York, recently published a folder having a list of users of sand mixing machines. The machines are designed to reprepare the molding sand during the night for the next day's molds. Approximately 200 users of the machines are listed alphabetically in the booklet. Quotations from letters of satisfied users are reproduced. An interesting feature of the folder is a map showing the location of, and naming every town in which a sand mixer is in use.

HARDWARE. — The Corbin Screw Corp., New Britain, Conn., American Hardware Corp., successor, recently issued a cloth-bound catalog describing screws, bolts, nuts, taps and other products. Each illustration is accompanied by a table of specifications, prices and other information. The line of machine screws, wood screws, cap screws and set screws manufactured is extensive. Prices and specifications of various kinds of chains are quoted. The concluding pages are devoted to data regarding taper pins, reamers, steel wire nails, miscellaneous wire nails and machine screw taps.

PLUNGER PUMPS.—A 32-page bulletin is being distributed by the Worthington Pump & Machinery Corp., New York, devoted to outside packed plunger pattern pumps. The general style of the bulletin is to devote each double page spread to one specific type of pump, the pump being illustrated on the left hand side of the page and described on the right. In the description are included tables of sizes and capacities. A numbered list of parts is presented at the end of the booklet to facilitate the consumer in ordering. A diagrammatic view of sectional elevations of steam ends is also shown. An entire list of products manufactured by the Worthington company is presented on the back cover.

HARDENING AND ANNEALING FURNACES.—A folder issued by the Capital Die, Tool & Machine Co., Columbus, O., describes an annealing and hardening furnace which is operated without the use of a blower. It is claimed that combustion is good and that oxidization of the work is reduced to a minimum. These furnaces are made with a draw plate on top of the furnace which is kept at a uniform temperature by the residue heat from the furnace. This draw plate is particularly useful in drawing the temper of either light or heavy parts. The furnaces are built in three sizes having internal dimensions of 4 x 6 x 12 inches, 5 x 9 x 15 inches, and 6 x 12 x 20 inches, respectively.

INSULATING BRICK.—A pamphlet recently issued by the Armstrong Cork & Insulation Co., Pittsburgh, contains the report of a test of insulating brick made in the power house of the Pacific Coast & Electric Co., San Francisco. It is claimed that a considerable saving in fuel burned was effected by the use of insulating material in the boiler settings. The insulating brick made by the Armstrong company are composed chiefly of kieselguhr. In the making of these brick the earth is mixed with finely ground cork, molded into brick form and then fired. The cork then is burned out leaving the brick porous. These brick are made in many different sizes and while light in weight, are said to easily resist a crushing force of approximately 135 pounds per square inch.

PORTABLE ELEVATORS.—"How to Pile" is the title of an interesting 24-page bulletin which is being distributed by the N. Y. Revolving Portable Elevator Co., Jersey City, N. J. The booklet describes a portable elevator which is said to be especially adapted to handling bulkly materials in warehouses. It consists of a revolving base, two uprights or elevator guides, and an elevating platform operated by a geared raising and lowering mechanism. The unit is mounted on strong truck wheels equipped with a floor lock. The machine is designed to tier or stack heavy bulky or fragile articles in any desired position, at any practical height. The principal feature of the machine is said to be the revolving base, by which the upper part of the machine is swung around on its ball bearing center. With the truck base anchored, the platform can, according to the booklet, be revolved about, be elevated and lowered and loaded and unloaded as desired.

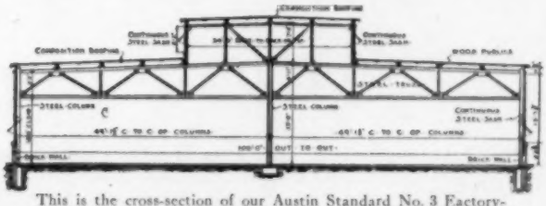
ELECTRIC BLOCKERS.—The Torrington Mfg. Co., Torrington, Conn., is distributing a booklet devoted to automatic electric blockers for blocking, winding or reeling strip metal. The operation of the machine is said to be as follows: When a strip of metal passes through the rolls it is carried between chisels, through upper and lower guide tables, under an electric strip contactor, and into the open lip of the winding drum. The strip contactor energizes a battery circuit of 9 dry cells which closes a strip operating the two solenoids. One solenoid releases the trip on the counterweight which drops into the lower position, thus raising the upper guide table vertically from the winding drum, and withdrawing the extension of the lower guide table horizontally from the winding drum. The other solenoid acts on a rod longitudinally through the hollow blocker shaft, operating a toggle joint and expanding the inner sleeve against the winding drum. This action clasps the end of the metal strip and the friction action starts the winding drum immediately revolving with the inner sleeve. The metal passes directly from the rolls to the winding block and automatically closes the lip as it is reeled up on the block.

TURRET LATHES.—The Gisholt Machine Co., Madison, Wis., has published a bulletin devoted primarily to lathes but containing many interesting pictures of early and modern types of balloons and airplanes. Although early efforts on the part of daring pioneers to make flights in crude balloons were attempted several hundred year ago, it was not until the latter part of the eighteenth century that any great skill in balloon making was attained. Blanchard's famous balloon appeared in 1785. This, together with other types made by later airmen, is illustrated and described. Airplanes are described in the section entitled "Heavier Than Air Machines," and the first one illustrated is that invented by Stringfellow in 1847. The machine was a triplane and contained the lightest type of steam engine known to that period. Following Stringfellow's invention a long period of inactivity set in, interrupted in 1890 by the invention of an "aerodrome" by Langley. From that period until the present time the development has been comparatively rapid. Many types of turret lathes, designed for rapid machining of airplane parts are illustrated in the booklet. The methods employed in machining engine cylinders, propeller hubs, propeller hub flanges, and gnome engine parts.

ELECTRIC MINE HOISTS. — Operating features and construction details of electric mine hoists are briefly sketched in a booklet recently issued by the Wellman-Seaver-Morgan Co., Cleveland. Among the advantages claimed for the standardized type of construction are low cost, better deliveries and easy substitution of parts in case repairs or replacements are needed. Several illustrations are given showing the company's hoisting units in actual use. Briefly, the types described include: A double self-contained drum hoist of the high type, capable of hoisting from 2500 to 6500 pounds inclusive of rope, at various speeds; a double drum hoist of the low type, capable of exerting a rope pull of 9000 pounds; a double drum first-motion hoist operated by a direct-connected 1850-horsepower direct current motor running at 71 revolutions per minute; an automatic hoist with a capacity of five tons, driven by a 75-horsepower alternating current motor and developing a rope pull of 18,600 pounds. A small winze hoist, driven by a 3-horsepower, direct or alternating current motor which operates at a speed of 1200 revolutions per minute is also illustrated. The motor operates continuously, the hoist being started and stopped by altering the position of a rotating shaft which engages or disengages the gears.

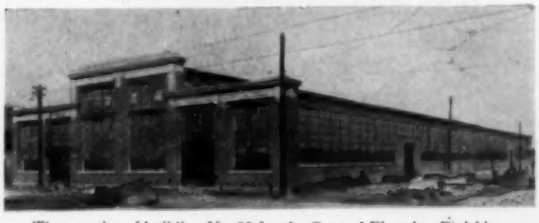
An Austin Standard Factory-Building Built for The General Electric Company at Schenectady, N. Y., in Thirty Working-Days

Austin Standard Factory-Buildings Can be Occupied in 30 Working-days



This is the cross-section of our Austin Standard No. 3 Factory-Building for light manufacturing. Building 89 of The General Electric Company, Schenectady, is a Standard No. 3, 100x300 feet.

Building No. 89 of The General Electric Company at Schenectady, N. Y., on May 19, 1917, 21 working-days after day of order. The steel is more than half up and the roof is going on.



The exterior of building No. 89 for the General Electric. Finishing this building on time last June brought us orders for five more buildings for the same customer, all of which have been finished *on time or ahead of time.*

YOU can move into a new Austin Standard Factory-Building in thirty working-days from the day you sign an Austin *Thirty-Day Guaranteed-Delivery Contract.*

This is possible because the Austin Company—subject to prior sale—actually has all the materials in stock ready for immediate shipment.

The General Electric Company, The Dayton Metal Products Company, the United States Government, and many others have already taken advantage of Austin 30-day Guaranteed-Delivery of completed floor-space.

You can close the contract for which you are negotiating, buy your machinery for delivery at a given date, and buy your building on the same basis: from a catalog, at a given price, for guaranteed delivery, ready for occupancy in thirty working-days.

Write, phone or wire the office nearest the proposed work.

The Austin Company

INDUSTRIAL BUILDERS

Cleveland, Ohio

New York Philadelphia Pittsburgh Detroit Indianapolis

Export Representatives: American Steel Export Co., Woolworth Bldg., New York

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit,	

Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	4.50c to 5.00c
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	4.65c
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	4.45c to 4.95c
Iron bars, Detroit	4.50c
Iron bars, St. Louis	4.45c
Iron bars, Cincinnati	4.65c
Iron bars, Philadelphia	5.00c to 5.20c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	5.00c to 5.25c
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	5.15c
Plates, Chicago	7.00c
Plates, Detroit	9.00c to 10.00c
Plates, St. Louis	7.05c
Plates, St. Paul	7.10c
Plates, New York	8.00c to 10.00c
Plates, Cleveland	9.00c to 10.00c
Plates, Philadelphia	8.50c
Plates, Cincinnati	7.50c
No. 10 blue anl. sheets, Chi.	8.00c
No. 10 blue anl. sheets, Cleve.	6.00c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	9.55
No. 10 blue anl. sheets, Cinci.	8.00c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 10 blue anl. sh., Detroit	9.50c
No. 28 black sheets, Chgo.	8.50c
No. 28 black sheets, Cleve.	6.75c
No. 28 black sheets, Cinci.	7.65c
No. 28 black, Detroit	9.50c
No. 28 black sheets, St. L.	9.25c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chgo.	11.00c
No. 28 galv. sheets, Cleve.	8.25c
No. 28 galv. sheets, Cinci.	9.65c
No. 28 galvanized, Detroit	11.00c
No. 28 galv. sheets, St. L.	11.50 to 11.75
Hoops, Cleveland	6.00c
Hoops, Detroit	7.00c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	21.25 to 22.00
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	24.00
Frogs, switches, guards, St. L.	26.00 to 27.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	30.00
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	30.00
Heavy melting steel, St. L.	30.00
Heavy melting steel, Birming.	30.00
Hydraulic press. sheets, Cleve.	24.50 to 24.75
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	23.00 to 24.00
Low phos. steel, Buffalo	39.00 to 40.00
Low phos. steel, Pittsburgh	38.00 to 40.00
Low phos. steel, eastern Pa.	36.00 to 38.00
Shoveling steel, Chicago	28.50 to 29.00
Shoveling steel, St. Louis	22.00 to 23.00
Steel rails, short, Chicago	33.50 to 34.00
Steel rails, short, Cleveland	31.00 to 31.50
Steel rails, short, St. Louis	32.00 to 33.00
Steel rails, old, Birmingham	22.50 to 23.50
Stove plate, Cincinnati	15.50 to 16.00
Stove plate, St. Louis	10.00 to 11.00
Stove plate, N. J. points	18.50 to 19.00
Stove plate, Birmingham	16.00 to 17.00
Stove plate, Buffalo	20.00 to 21.00
Stove plate, eastern Pa.	22.00 to 23.00
Stove plate, Pittsburgh	20.00 to 21.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$18.00 to 19.00
Boiler plate, cut, No. 1, St. L.	14.00 to 16.00
Bundled sheets, Cincinnati	16.50 to 17.00
Knuckles, coup., Chicago	31.00 to 32.00
Knuckles, coup., St. Louis	32.00 to 33.00
Springs, Chicago	36.50 to 37.50
Stove plate, Chicago	17.00 to 17.25
Stove plate, Cleveland	17.00 to 18.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:	
Boston	$6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	5.75
Philadelphia (r. and w.)	4.80
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Buffalo	25.00 to 26.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	20.00
Cast borings, eastern Pa.	20.00
Cast borings, Buffalo	20.00
Cast borings, Pittsburgh	20.00
City wrought, long, N. Y.	29.00 to 30.00
Forge flashings, small, Cleve.	23.50 to 24.00
Forge flashings, large, Cleve.	22.00 to 23.00
Forge No. 1 Eastern Pa.	22.00 to 23.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	18.50 to 19.00
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.50 to 43.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00
Iron rails, Chicago	36.00 to 37.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Buffalo	$20.00
Machine turnings, N. Y.	20.00
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	20.00
Machine turnings, Birming.	20.00
R. R. mch. cast, No. 1, Buff.	27.00 to 28.00
R. R. wrought, 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
R. R. wrought, No. 1, Pitts.	35.00
R. R. wrgt. No. 1 Birmingham	35.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	28.50 to 29.50
Wrought pipe, New York	25.00 to 26.00

(Net Tons)

Angle bars, iron, Chicago	$35.50 to 36.00
Angle bars, steel, St. Louis	24.00 to 25.00
Arch bars & transoms, St. L.	34.00 to 35.00
Arch bars & transoms, Chgo.	36.00 to 37.00
Busheling, No. 1, Chicago	21.00 to 21.50
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, Cleveland	22.25 to 23.00
Busheling, No. 1, St. Louis	17.00 to 18.00
Busheling, No. 2, Chicago	14.00 to 15.00
Cast borings, Cincinnati	17.14
Cast borings, Cleveland	17.14
Cast borings, St. Louis	17.14
Cast borings, Chicago	17.14
Cut forge, Chicago	27.50 to 28.00
Grate bars, Cleveland	17.25 to 18.50
Iron axles, St. Louis	36.00 to 37.00
Iron axles, Chicago	42.50 to 43.50
Iron axles, Cleveland	44.00 to 45.00
Machine turnings, Chgo.	17.14
Machine turnings, Cleve.	17.14
Machine turnings, Cinci.	17.14
Machine turnings, St. L.	17.14
Pipes and flues, Cleveland	21.50 to 22.50
Pipes and flues, Chicago	18.50 to 19.00
Pipes and flues, St. Louis	15.00 to 16.00
Railroad wrought, 1, Cleve.	35.00
Railroad wrgt., No. 1, Chgo.	30.00 to 31.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt. No. 1, St. L.	29.00 to 30.00
Railroad wrgt., No. 2, Chgo.	27.00 to 27.50
Railroad wrgt. No. 2, St. L.	26.00 to 27.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$22.00 to 23.00
Axle turnings, Buffalo	25.00 to 26.00
Shafting, New York	34.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	35.00 to 37.00
Steel car axles, St. Louis	34.00 to 35.00
Steel car axles, Chicago	40.00 to 41.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	30.00 to 31.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00 to 31.00
Car wheels, Buffalo	30.00 to 31.00
Car wheels, Chicago	27.00 to 28.00
Car wheels, St. Louis	29.00 to 30.00
Car wheels, Birmingham	21.50 to 22.50
Car wheels, Cleveland	26.00 to 26.50
Tram car wheels, Birming.	18.50 to 19.50
Cast, No. 1, Birmingham	22.00 to 23.00
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast, 1, heavy, N. J. points	30.00
Cast, No. 1, eastern Pa.	28.00 to 30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	20.50 to 21.00
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	28.00 to 29.00
Malleable railroad, Pittsburgh	28.00 to 29.00
Malleable railroad, east. Pa.	30.00 to 32.00

(Net Tons)

Cast No. 1, Cleveland	22.50 to 23.50
Cast, No. 1, Chicago	21.00 to 22.00
Cast, No. 1, Cincinnati	23.00 to 23.50
Cast, No. 1, St. Louis	19.00 to 20.00
Malleable railroad, Chicago	26.00 to 27.00
Malleable railroad, St. Louis	24.00 to 25.00
Malleable agricultural, Chgo.	22.00 to 23.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$34.00 to 36.00
Reroll. rails, 5 ft. & ov., Chgo.	36.50 to 37.00
Reroll. rails, 5 ft & ov., E. Pa.	28.00 to 32.00
Reroll. rails, 5 ft. & ov., St. L.	36.00 to 37.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, Chicago	33.00 to 34.00
Locomotive tires, St. Louis	33.00 to 34.00